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FM 31-75 (TEST)

DEPARTMENT OF THE ARMY FIELD MANUAL

RIVERINE OPERATIONS

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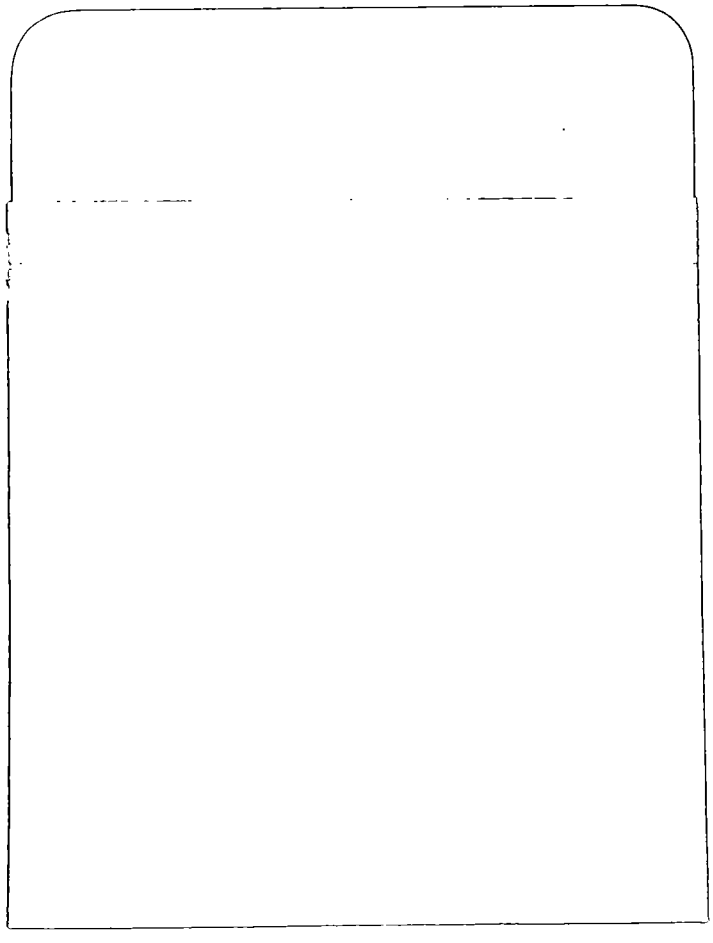

FIELD MANUAL
No. 31-75 (TEST)

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *24 June 1968*

RIVERINE OPERATIONS

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1–1. Purpose

a. This test manual presents concepts and techniques for training and employing forces in a riverine environment. It outlines interim doctrine, tactics, techniques, and procedures for training an infantry division for employment in stability operations where inland waterways are the primary lines of communications (LOC).

b. The manual is written primarily to serve the immediate requirements imposed by operations in Vietnam and secondarily to provide further information on the development of concepts and doctrine concerning riverine warfare conducted in a more general riverine environment.

c. The significant operational concept of riverine warfare concerns the sustained employment of forces in a riverine environment, one element of which is the force operating on the waterways. Military forces equipped and trained to operate on rivers and canals in conjunction with airmobile and overland forces can add a new dimension to mobility and firepower, can successfully dominate the overall environment, and can control its routes of communication and populated areas.

d. The contents of this manual are applicable to—

(1) Nuclear and nonnuclear warfare.

(2) Employment of, and protection from, chemical, biological, and radiological (NBC) weapons or agents.

(3) Stability operations.

1–2. Scope

a. This manual covers doctrinal concepts, operating techniques, and procedures for infantry divisions; and it specifically applies to units based afloat or supported by Naval units. It adapts existing doctrine, terminology, and techniques to riverine operations.

b. This manual provides guidance in the intergration of ground forces, naval units, and supporting air forces conducting joint operations. The nature of riverine operations requires utmost coordination and cooperation between the forces involved. Their operations are interdependent, and the combined forces operate as a single tactical entity responsive to the needs and requirements of the ground force.

c. This manual deals primarily with the riverine operations in areas like the Mekong River Delta in South Vietnam.

d. Equipment for use by, and in support of, forces afloat are described in appendix B.

e. Users of this manual are encouraged to submit recommendations to improve its clarity or accuracy. Comments will be keyed to the specific page, paragraph, and line of the text in which they recommend a change. Users will provide reasons for each comment to insure understanding and complete evaluation. Users will forward comments direct to the Commanding General, U.S. Army Combat Developments Command Institute of Combined Arms and Support, Fort Leavenworth, Kansas 66027. Originators of proposed changes that would constitute a significant modification of approved Army doctrine may send an information copy, through command channels, to the Commanding General, U.S. Army Combat Developments Command, Fort Belvoir, Virginia 22060, to facilitate review and followup. Comments based on tests, maneuvers, and combat experience are especially solicited to assist in preparing FM 31–75.

1–3. Definitions

The following definitions are associated with the terms used throughout this manual. These definitions apply to, but are not necessarily limited to, riverine operations.

a. Riverine area (environment)—A land environment dominated by water LOC. It may contain an extensive network of rivers, streams, canals, paddies, swamps, or muskeg extending over broad, level terrain, parts of which may be inundated periodically or permanently. It may include sparsely populated swamps or forests, rivers and streams that have steep banks densely covered with tropical trees or bamboo; and relatively flat, open terrain. A large agrarian population may concentrate along the waterways. Ocean tides may affect riverine areas near the seacoast or far inland.

b. Riverine warfare—All military activities designed to achieve and/or maintain territorial control of a riverine area by destroying enemy forces and restricting or eliminating their activities. The significant characteristic of riverine operations is the extensive use of joint waterborne forces together with groundmobile and airmobile forces in a predominantly land battle. The basic nature of riverine operations is sustained ground combat in a land environment dominated by water LOC's.

c. River warfare—River warfare refers only to specific tasks by naval components—water patrol, transport, and combat support—as part of overall riverine warfare.

d. Riverine force—The force organized or assembled to conduct riverine operations, composed of naval; air, when available; and ground forces operating from afloat or land bases responsive to the ground force commander.

e. Waterborne operations—Operations in which combat forces and their combat and combat service support elements move about the battlefield in watercraft under the control of a ground force commander to engage in ground combat.

f. Land base—A shore installation for ground and naval forces during a riverine campaign. The base includes the surrounding land and water areas required for close-in security.

g. Afloat base—A concentration of naval barracks ships, supporting ships, and watercraft for use as a mobile base by both ground and naval forces during a riverine campaign. The base includes the surrounding land and water areas required for close-in security.

h. Tactical area of responsibility (TAOR)—That area within which a designated unit has certain continuing responsibilities. The unit coordinates with host country military and civil authorities in meeting these responsibilities. They include, but are not limited to, the following specific functions:

(1) Defense of key installations.

(2) Conduct of operations, including reaction operations, necessary to secure the area against enemy regular (main), regional, or village militia forces.

(3) Support of host country internal defense and internal development programs.

i. Area of operations (AO)—A specified area in which designated forces conduct tactical operations for prescribed periods of time. Activities in these areas and the responsibilities of the designated units operating within them are coordinated with host country officials in the course of operational planning. In an AO, operations usually are not of a continuing nature, and civil affairs operations are more limited in scope.

j. Combat base—A temporary base in an AO established by a brigade or battalion, consisting of essential command and control, fire support, and combat service support elements of the unit. Supporting naval elements and attachments needed to accomplish the assigned mission are included in the base.

k. Patrol base—A temporary base established by a company from which it conducts extensive patrolling, reconnaissance, raid, or other operations.

l. Sector Operations and intelligence coordination center (SOICC)—A host country facility where representatives of all operations and intelligence-gathering agencies within the political division (state or province) coordinate. This facility grants clearances to all fire support agencies within the area, identifies friendly and enemy-controlled areas, and designates free fire areas. Representatives of host country, U.S., and other Free World military forces assist force commanders in planning

and coordinating all operations within the political division.

m. Combat support coordination center (CSCC)—A facility where representatives of the host country, U.S., and other Free World military forces providing operational assistance to combat elements assist force commanders in planning, coordinating, and controlling all available combat support.

n. Killing zone—The portion of an ambush site where fires are concentrated to isolate, trap, and destroy the target.

o. Assault boats—A generic term that includes inflatable boat, small (IBS); boat, landing, inflatable, assault craft; boat, reconnaissance, pneumatic; assault boat, plastic; swimmer support boat; fire team assault boat; and Boston Whaler.

f. Air Cushion Vehicle—A vehicle that operates over land and water riding on a cushion of air.

Section II. NATURE OF RIVERINE OPERATIONS

1–4. Background

Riverine warfare is not a new type of military operation. The U.S. Marine Corps conducted riverine operations in the Florida Everglades from 1837 to 1842, and in Nicaragua in the late 1920's. The U.S. Navy conducted riverine operations along the Yangtze River in China from 1927 to 1932. The U.S. Army conducted riverine operations along the James and Mississippi Rivers and in southern swamps during the Civil War and in Mindanao in the Philippines in World War II. The British fought along the Nile River in 1898, and the Japanese fought along the Yangtze from 1937 to 1945. More recently, the French Naval Assault Divisions (Dinassauts) fought against the Viet Minh in the Tonkin and Mekong Deltas from 1946 to 1954. Since then, Republic of Vietnam Army units and Navy river assault groups (RAG) have conducted riverine operations against Viet Cong insurgents along the extensive waterways of the Mekong Delta.

1–5. Distinguishing Characteristics

a. In developing areas with limited land transportation and abundant surface water, inland waterways provide natural routes for transportation and are logical centers of population. In some developing countries, inland waterways are major arteries for economic circulation. River transportation of local products, such as rice and charcoal, may necessitate military operations to keep waterways open and, in some instances, to transport local produce to maintain the local economy. These operations may not involve extensive, recurring combat actions. Water routes have strategic and tactical importance to an insurgent or enemy force. They are particularly important in situations where an external aggressor supports and directs insurgency. Such a situation dictates a doctrine and strategy of interdiction and control of waterways. Operations involving this doctrine are known as riverine operations.

b. In many ways, inland waterways resemble roads or railways and can be considered simply as LOC. The enemy may use these LOC for access or egress for infiltration of individuals and small units. The mission of the infiltrators may be a raid or ambush; it also may be subversion, espionage, reinforcement of engaged units, or eventual regroupment for a future operation. Tactical principles that govern the control and use of inland waterways for military operations are essentially the same as those that apply to land LOC. Equipment for waterborne operations may look different, but it serves the same purposes as equipment for ground operations. Ships and watercraft are substitutes for wheeled and tracked vehicles in meeting armor, armament, and transport requirements. Ground forces consider waterways as LOC rather than obstacles to cross. Navy forces operating on inland waterways have to be familiar with the principles of ground combat because these principles determine the characteristics of the watercraft required and their employment.

c. Military forces equipped and trained to operate on rivers and canals, together with airmobile and groundmobile forces, provide an

added dimension to mobility and firepower. Riverine warfare differs from conventional ground warfare chiefly in environment. The fundamentals and tactics applicable in conventional ground operations apply in riverine operations. Special organization, techniques, and operating procedures are required when ground forces, supported by Navy ships and craft, operate directly from inland waterways. These special considerations are outlined in subsequent chapters.

d. Riverine warfare is not just another aspect of amphibious operations. Riverine warfare is distinct in that it requires continual use of specialized watercraft, equipment, and techniques and usually takes place where amphibious operations are not practicable.

CHAPTER 2

OPERATIONAL ENVIRONMENT

Section I. GENERAL

2–1. Introduction

A thorough understanding of a riverine environment is necessary to plan and conduct riverine operations. In a riverine area, watercraft are the principal means of transport. The people settle along waterways, often the only lines of communications (LOC). Civilian traffic and settlements conceal the enemy's movements and help to conceal mining and ambush operations. The physical characteristics of the environment dictate the sociological and economic development of the area. The control of waterways is necessary to establish and maintain control in riverine areas.

2–2. Riverine Environments

A riverine environment is dominated by water LOC, possibly several major rivers and tributaries or an extensive network of minor waterways, canals, and irrigation ditches. Military movements use air and water transportation extensively because of the lack of a suitable road net. Suitable land for bases, airfields, and artillery firing positions may not always be available because of the topography, location of civilian population, restrictions on withdrawing land from agricultural use, or a combination of these factors.

a. Constructing bases and airfields on the fill from dredging operations is a solution. Major disadvantages to it are the expense involved and the time expended to reclaim adequate land. Normal dredging may create new land but at locations unsuitable for bases and airfields. Also, dredging equipment may not be available solely to reclaim land for a base.

b. Another solution to the problem of land areas for bases is to use Navy ships as a mobile afloat base. Such a base can move to an area of operations (AO) as needed. The afloat base provides a suitable launching point for waterborne operations and, because it does not occupy land, it reduces the impact on the civilian population. A nearby airfield, providing a base for an airborne forward air controller (FAC), is a major consideration in selecting the site for the afloat base.

2–3. Riverine Areas

Riverine areas are not restricted geographically; they may be found worldwide. Examples of riverine areas follow:

a. The Mekong River Delta and the Plain of Reeds in South Vietnam.

b. The Red River Delta in North Vietnam.

c. Portions of Cambodia, Laos, and China (Estuaries of the Yellow River (Shantung Province) Yangtze River (Shanghai-Manking), and Sikiang River (Hongkong-Canton).

d. The Ganges River in East Pakistan.

e. The Congo, Niger, and parts of Nile River systems in Africa.

f. The lower reaches of the Magdalena River in Colombia.

g. The Amazon and Parana Rivers and their tributaries in South America.

h. Portions of Alaska.

i. The lower reaches of the Mississippi River.

j. Burma-Irrawaddy Delta.

k. Thailand-Central Lowland Region, Chao Phraya River and its tributaries.

Section II. ENEMY FORCES

2–4. General

This section provides general information on typical enemy forces that may operate in a riverine environment. It focuses on tactical forces rather than underground cadres and political organizations. An extensive network of underground cadres and political organizations normally provides intelligence, counterintelligence, political activity, and logistic support to enemy units in the area. FM 31–16 provides additional information on underground cadres and political organizations.

2–5. Organization and Missions

Enemy forces may vary from individuals to squads and from platoons to divisions or larger units. Enemy armed forces normally consist of three principal types: regular (main), regional, and village militia. They differ from one another in organization, training, weapons, equipment, and mission.

a. Regular armed forces can conduct any operation normally assigned to military units. They move throughout the area because of operational requirements or because of the effectiveness of friendly destruction or neutralized operations. They normally have the best available weapons, equipment, and uniforms and also have, or have access to, enough local watercraft for complete watermobility. These forces, usually battalions, regiments, or divisions, are well trained and well led. They operate with regional and village militia forces. The regular units may consist of personnel who are natives, or they may be units introduced by external sponsoring powers.

b. Regional forces are not as well organized, trained, or equipped as regular forces. Organizationally, they may be platoons, companies, battalions, or, occasionally, regiments. These units make limited attacks harass friendly installations and troops, and attempt to ambush reaction forces. They are normally assigned to a specific operational area and seldom operate elsewhere. Regional forces usually consist of personnel who are natives and are familiar with the area's waterways.

c. Village militia forces collect intelligence information, build bases, fortify villages, act as scouts or porters for regular or regional forces, and provide security for the political infrastructure at the local level. Members of village militia units continue to follow their civilian occupations and receive limited miltary training and extensive political indoctrination. As part-time military forces, they harass or delay friendly forces by sniping, mining, and rigging boobytraps.

2–6. Control of Geographical Areas

The disposition of enemy forces in a riverine area depends primarily on control exercised by the host country, supported by U.S. and other Free World military forces. The control fluctuates with the effectiveness of the overall internal defense and internal development effort, the size and capabilities of enemy forces, and the attitudes of local civilians. Areas are generally defined as—

a. Enemy-Controlled Areas. Enemy forces in a riverine environment usually do not secure and hold terrain. They may have base areas or havens where they maintain headquarters, hospitals, communications centers, facilities for manufacture of munitions, facilities for manufacture of clothing and equipment, facilities for storage of supplies, and training areas. These bases may be anywhere; but they are usually in remote areas where some terrain feature provides protection. Extensive areas of mangrove or other swamp forests provide ideal positions. The enemy establishes outposts on the routes into the area to provide early warning of a ground or waterborne attack. They may resolutely defend the area or may disperse to innumerable hiding places. Friendly forces may occupy isolated towns or outposts in the area, but enemy forces dominate most of the countryside.

b. Contested Areas. These are the principal areas where regular or regional enemy forces conduct offensive operations. They may not resolutely resist the movement of friendly forces; however, harassment of these movements is customary. The enemy masses battalion-size units for short, violent attacks on isolated friendly outposts and troop units. He ambushes friendly units of any size when heavy casualties can be inflicted. In these areas, when dealing with the local civilians,

the enemy uses persuasion, threats, and violence.

c. Friendly Controlled Areas. Enemy offensive operations are normally limited to raids, small ambushes, sniping, and mining operations in these areas. Battalion or larger units may make coordinated attacks to penetrate these areas. Enemy activities also include such covert operations as subversion, espionage, psychological operations, terrorism, and sabotage.

2–7. Activities

Enemy activities in a riverine environment though similar to those in other operational areas, will be affected by the peculiarities of the geographical conditions.

a. Offensive Operations.

(1) The enemy may mass battalions or larger units for short, violent attacks on isolated friendly outposts and troop units. He may limit his operations to raids, sniping, mining operations, subversion, espionage, psychological operations, terrorism, or sabotage.

(2) Host country LOC may be subjected to continuous or intermittent harassment to deny friendly forces the use of the LOC or to delay, harass, and prevent movement along the routes. Bridges and roads may be destroyed or they may be blocked sufficiently to stop or restrict military traffic and to allow civilian traffic to move with difficulty. The use of mines and demolitions, to include command detonated mines, is extensive. Obstacles frequently block waterways to military traffic and allow civilian traffic to move with difficulty.

b. Enemy Defensive Operations. In defense, enemy units take full advantage of heavy vegetation and tree lines. These wooded areas vary in width from a few to several hundred meters.

(1) Enemy forces usually prepare primary and alternate defensive positions to defend against airmobile attacks along waterways. Primary positions usually are inside the tree line on suspected landing zones (LZ), oriented toward the open field. These positions provide excellent observation, fields of fire, and maximum grazing fire into the LZ. Delaying positions are constructed to allow the force to conduct a delay back to a waterway, to break contact, and to withdraw.

(2) Normally, trails and footpaths are constructed parallel to the banks of waterways. They contain obstacles and boobytraps to canalize an attacking force. The obstacles may be natural plants (cactus) or artificial obstacles (bamboo fences and punji stake barriers).

(3) An enemy unit occupying a hamlet places all-round security well forward of the defensive positions. When attacked, the security elements alert the main force and take the attacking force under fire. This fire is normally long-range sniper fire designed to slow the advance rather than to inflict casualties. If possible, the main enemy force withdraws to succeeding positions as the attack advances and fights only when it detects a weakness in the attacking force.

(4) If, in attempting to withdraw, the enemy force is trapped and must stand and fight, it usually allows the attacking unit to come within 100 meters before it initiates a large volume of fire to stop the attack. By conducting the firefight at close range, the enemy attempts to prevent the attacking force from employing artillery fires and airstrikes.

(5) When the attack continues, the enemy usually attempts to exfiltrate. The enemy force may break into small groups to exfiltrate. To prevent the capture of weapons and ammunition, the enemy force loads them into small boats and sinks the boats in the major waterways. All civilians leaving the operational area must be screened to prevent enemy personnel from escaping. Once the area has been overrun, defensive positions and canals must be searched to locate hidden equipment and boats that may have been sunk.

c. Ambushes. Movements on the waterways and on the limited road net are particularly vulnerable to ambush. The climate in most riverine areas permits ambushing forces to remain in position for a considerable time without undue physical discomfort. The heavy vegetation along many of the waterways and roads provides concealment, and the terrain generally provides some cover. Ambushes (ch 5) are similar, whether the ambush site is on a road, a trail, or a waterway.

d. Use of Waterways.

(1) Enemy units normally plan operations to use water transport extensively. The geographic area or the extent of friendly control in the area may require the enemy to operate during darkness or reduced visibility.

When cover or concealment is nonexistent along streams or canals, enemy units may move at night even in their own base areas. Enemy movements along canals often can continue during high or low tide because their craft are generally lighter than friendly craft. During an extremely dry season, the enemy may not be able to use boats at low tide. In contrast, both high and low tides hamper friendly forces. During low tide, heavier friendly craft will not float. Armored troop carriers (ATC) may run aground when the water is 1 to 1.5 meters deep. During high tide, friendly watercraft with high superstructures cannot pass under many bridges and must wait until the tide recedes. Planners study tide tables to determine the effects of tides on planned operations.

(2) In areas under friendly surveillance during waterborne movements, the enemy uses a variety of security measures, to include advance boats, security elements on shore, and signal systems. When enemy units move during daylight, they stay close to shore to prevent detection from the air. Normally they move during daylight only when they control the surrounding area or along waterways that provide concealment. They usually avoid concentrating more than three or four boats at one location. The enemy may construct inlets in concealed locations to hide boats if their movements are detected.

Section III. HOST COUNTRY AND FREE WORLD FORCES

2–8. Host Country Forces

Host country forces may consist of regular armed forces, paramilitary forces, police, irregular forces, and civilian agencies.

a. Regular Armed Forces.

(1) Army forces, containing standard and specially trained units, make up the largest contingent of readily available host country troops that can move throughout a nation. The specially trained units include airborn and ranger units. Both regular and specially trained units may have an airmobile capability.

(2) Host country air forces may conduct close air support, airmobile, tactical airlift, visual reconnaissance, radio-relay, and target acquisition missions and may provide liaison elements for forward air control. These forces may conduct coordinated operations with U.S. Air Force operations supporting combined riverine operations or unilateral operations supporting host country forces exclusively.

(3) Host country naval forces, including naval infantry or marines, can operate in riverine areas or in coastal areas adjacent to them. These forces maintain offshore surveillance, provide naval gunfire support, and patrol inshore coastal areas and inland waterways. Naval infantry or marines are employed as infantry after an amphibious landing or in riverine operations.

b. Paramilitary Forces. The organization of paramilitary forces is similar to that of regular armed forces. Paramilitary forces consist of indigenous armed volunteers who are familiar with the terrain and people in the area of operations. Units have individual weapons, light machineguns, light mortars, and limited communication equipment. The primary mission of paramilitary forces is to relieve the regular armed forces of security missions and local defense duties in a given political division. They often enforce laws and maintain public order in rural areas. Their other typical tasks are defending villages and guarding headquarters, bridges, key installations, and local airstrips. Paramilitary units from squad through battalion may be trained to perform limited tactical missions. In performing their security roles, paramilitary units raid and ambush, either alone or with irregular or regular armed forces. They may reinforce outposts under attack or pursue withdrawing enemy elements.

c. Police Forces. Police forces, consisting of local, regional, and national police elements, are normally the host country's primary populace and resources control agency. They are oriented on the population and may be the only effective host country force in a given locale. Police forces attempt to detect enemy underground elements and provide intelligence to military units. They maintain law and order and protect key governmental installations and public facilities. In areas where police forces are inadequate to perform these missions,

regular armed and paramilitary forces may perform certain police-type functions in the maintenance of law and order.

d. Irregular Forces. Irregular forces, or armed groups of individuals who are not members of regular armed forces or paramilitary forces, may be mobilized, trained, and armed to supplement the regular military, paramilitary, and police forces.

e. Civilian Agencies. Governmental and private civilian agencies, organizations, and religious welfare groups are concerned chiefly with internal development. These groups may conduct immediate impact programs in areas receiving troop protection for limited times and long-range programs where governmental control has been established.

2–9. Other Free World Military Forces

Other Free World military forces may support host country and U.S. Forces in riverine operations.

CHAPTER 3

ORGANIZATION AND COMMAND

Section I. GENERAL

3–1. Introduction

a. By their nature, riverine operations are joint operations undertaken primarily by Army and Navy forces. Joint riverine operations require the coordinated and integrated efforts of participating forces to achieve a common objective. Department of Defense (DOD) and Joint Chiefs of Staff (JCS) directives prescribe joint forces command arrangements to insure coordination and integration. Joint command organizations provide for central direction to coordinate the efforts of the forces committed, decentralized execution to accommodate the detailed action of a large number of commands or individuals and common doctrine among the forces involved.

b. Environmental conditions and tactical situations differ from one riverine area to another. Enemy forces may vary from lightly armed village militia units to regular military units. The environment varies with the tides and seasons, which further complicate extended operations over an area with many differences in terrain. Friendly ground forces may be transported by wheeled, mechanized, airmobile, airborne, or waterborne vehicles. They may operate with U.S. Navy river forces, U.S. Air Force support units, or host country forces. The organization is flexible to insure control and coordination of these forces in varying operational environments.

3–2. Type of Forces

Mission, enemy, terrain and weather, and troops available (METT) are the bases for the task organization. Riverine operations require a balance between types of forces, considering the total forces available. Afloat-based Army battalions are employed primarily as waterborne units. A land-based unit has the same capability when employed with one or more U.S. Navy river assault squadrons (RAS), located on a nearby river line of communications (LOC). A special consideration in task organization for riverine operations is the amount of troop lift and fire support available from Navy, Army aviation, and Air Force units. The major factors determining naval support requirements are—

a. The extent to which navigable waters will permit movement of naval support to, within, and around the area of operations (AO).

b. The size of Army forces needed in the objective area, the availability of other means, and the desirability of using other means to deliver them.

3–3. Army Requirements

Army requirements to accomplish the mission determine the strength and organization of Navy and other supporting forces.

Section II. COMMAND AND CONTROL

3–4. General

The command relationships outlined herein concern U.S. Army and Navy elements with possible U.S. Air Force support participating in joint or combined riverine operations. The unified or subordinate unified command commander who assigns forces for riverine operations specifies the command structure above the Army division/Navy flotilla level. When riverine operations are an integral part of in-

ternal defense and internal development operations, the unified or subordinate unified command commander also prescribes appropriate relationships with host government agencies in the AO. The variety of environmental influences and tactical situations that may be encountered in a riverine area prevents establishment of one command arrangement that is suitable for all situations and areas.

3–5. Typical Command Arrangements

a. Joint Task Force. The optimum command arrangement for riverine operations involving Army and Navy elements is the joint task force (JTF) (JCS Pub. 2, para 30251). The senior commander of the Army force is the JTF commander. He organizes or constitutes a staff using the assets available among the staffs of assigned component forces.

(1) The JTF organization provides for unity of command during joint operations. It provides for a clearly understood succession of command, creates a closely integrated force, and supports planning continuity. These criteria for establishing a JTF (JCS Pub. 2, para 30252) apply particularly during riverine operations. They permit a JTF to organize subordinate JTF's, which apply particularly at the maneuver battalion, RAS echelon (fig. 3–1).

(2) The JTF is under the operational control of an appropriate unified command, subordinate unified command, JTF, or other designated commander. The JTF insures the coordination of operations with respective Service components of the unified, subordinate unified, or JTF command.

(3) The Navy element commander of the JTF is in tactical control when the force is embarked in watercraft and moving from one location to another. JCS Pub 1 defines tactical control as the detailed and, usually, local direction and control of movements or maneuvers necessary to accomplish missions or tasks assigned.

b. Close Support. This command arrangement, though it does not provide unity of command, provides for control of riverine operations by mutual cooperation and coordination. The Navy element provides close support (JCS Pub. 2, para 30276) to the Army element. The Army element is under the operational control of a designated Army component commander. The Navy element, under the operational control of a designated Navy component commander, has a mission of close support to the Army element. Support, as defined in JCS Pub. 2, paragraph 30276, provides for the accomplishment of the mission. The Army commander exercises general direction of the Navy effort within the limits permitted by accepted naval tactical procedures. Such direction includes designation of targets or objectives, timing, duration of the supporting action, and other instructions necessary for coordination and efficiency. The Navy commander prescribes the tactics, methods, and procedures that the Navy element employs to provide the required support. This arrangement does not provide for unity of command. Army elements may be required to provide close support to Navy elements conducting essentially naval operations.

c. Attachment. See JCS Pub. 2, chapter III, section 2, subsection 6.

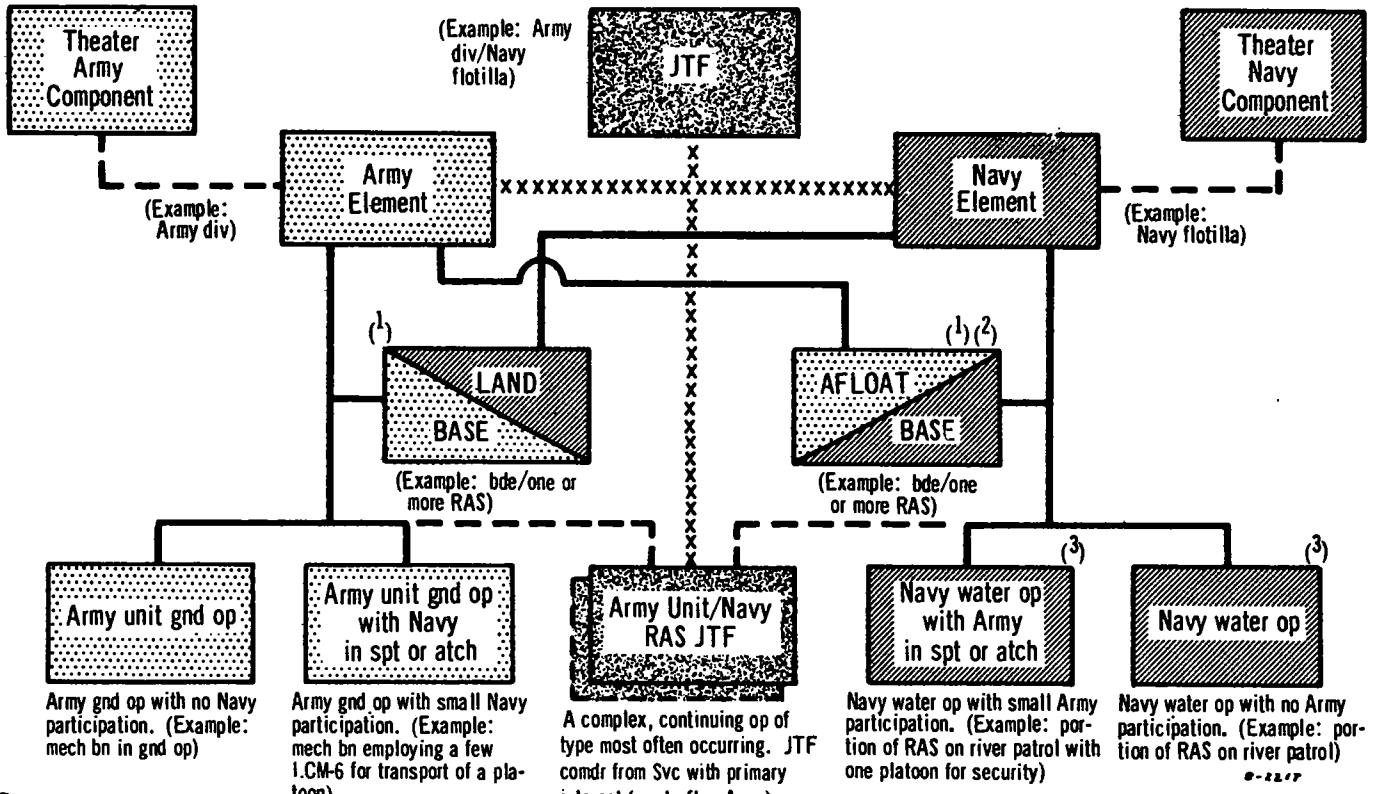
(1) This command arrangement may provide for the Navy element to be attached to the Army element. In this event, the Army commander commands both Army and Navy elements engaged in the operation. This arrangement provides unity of command of the riverine force (JCS Pub. 2, para 30204). The Navy element commander is in tactical control (JCS Pub. 1) of the riverine force during those phases identified as Navy command responsibilities.

(2) This command arrangement may provide for the Army element to be attached to the Navy element. In this event, the Navy commander commands both Navy and Army elements engaged in the operation. This arrangement provides unity of command of the riverine force (JCS Pub. 2, para 30204). The Army element commander is in tactical control (JCS Pub. 1) of the riverine force during those phases identified as Army command responsibilities.

d. Others. Any other command relationship would be a modification of those discussed above.

3–6. Security Responsibilities

The following security responsibilities apply under any command arrangement:


Theater Army Component
(Example: Army div/Navy flotilla)
JTF
Theater Navy Component
(Example: Army div)
Army Element
Navy Element
(Example: Navy flotilla)
(1)
LAND BASE
(Example: bde/one or more RAS)
(1) (2)
AFLOAT BASE
(Example: bde/one or more RAS)
Army unit gnd op
Army gnd op with no Navy participation. (Example: mech bn in gnd op)
Army unit gnd op with Navy in spt or atch
Army gnd op with small Navy participation. (Example: mech bn employing a few LCM-6 for transport of a platoon)
Army Unit/Navy RAS JTF
A complex, continuing op of type most often occurring. JTF comdr from Svc with primary interest (most often Army). May have sub-JTF. Svc components of JTF are under comd--less op con of JTF svc components. (Example: bde/two RAS)
(3)
Navy water op with Army in spt or atch
Navy water op with small Army participation. (Example: portion of RAS on river patrol with one platoon for security)
(3)
Navy water op
Navy water op with no Army participation. (Example: portion of RAS on river patrol)

LEGEND

——— --Comd.

XXXXX --Op con.

– – – --Comd less op con.

--Army.

--Navy.

--JTF.

[1]Bases jointly occupied by Army and Navy forces. Army force is commanded, to include operational control, through Army channels. Navy force is commanded, to include operational control, through Navy channels. Army provides base comdr and is responsible for base security. Navy provides appropriate share of security forces. May be organized as JTF. (Most likely case is afloat base.)

[2]When relocating, officer in tactical comd is senior Navy officer assigned. Base comdr (Army) remains responsible for security.

[3]In case of naval craft on resupply mission, senior Army commander in riverine area is responsible for security (may be comdr, JTF).

Figure 3–1. JTF organization.

a. The base commander of all jointly occupied Army and Navy riverine bases, afloat or ashore, is the senior Army commander assigned.

(1) As base commander of a land or an afloat base, the Army commander is responsible for local base defense (JCS Pub. 2, para 40209).

(2) The relationship between Army and Navy elements stationed on a land or an afloat base is one of coordination or mutual support. The Army and Navy elements assign their appropriate share of forces for local base defense as the base commander directs. The primary mission of the Navy force in base defense is provision of gunfire support and protection against any threat from the water. Chapter 8 provides details of base defense.

b. During tactical operations, the army commander is responsible for providing security elements (ground or air) along the route of movement, to inlude the movement to contact and withdrawal to base areas. The Navy element commander exercises tactical control of the movement and maneuver of watercraft under the operational control of the Army commander being supported. Paragraphs 4–12 through 4–15 describe waterborne operations in detail.

c. The senior Navy commander embarked is in tactical control while the afloat base is en route from one anchorage to another. Higher headquarters normally directs or approves the relocation of the afloat base. Recommendations to the afloat base commander and the senior Navy commander of the riverine force form the bases for decisions to relocate the afloat base. The afloat base commander orders emergency relocations and informs both higher and subordinate headquarters of the move.

d. The Navy commander of the riverine force is responsible for the movement of Navy ships and watercraft between riverine bases and support facilities outside the riverine area. The Army commander in the riverine area is responsible for the security of movement of these ships within the area.

3–7. Liaison

Specific liaison requirements and responsibilities are outlined in applicable sections of this manual.

Section III. ARMY FORCES

3–8. Infantry Division

a. Infantry divisions can conduct operations in a riverine environment without major reorganization, although specialized items of equipment are required, as well as provision for temporary storage and maintenance of vehicles and equipment that will not be used in such operations. These units use water transport as an additional means of mobility. Infantry divisions can operate in adverse weather and on difficult terrain—significant factors in riverine operations. FM 61–100 provides detailed information on the employment of the division.

b. The division, brigades, and battalions require augmentation with civil affairs and psychological operations (PSYOP) personnel in densely populated areas.

3–9. Nondivisional Forces

a. U.S. Army units supporting the division or operating in the area may include—

(1) Artillery. (Medium- and heavy-caliber field artillery units, aerial rocket artillery, target acquisition battery or battalions, artillery meteorology detachments.)

(2) Armored cavalry regiment or separate armored or air cavalry squadrons.

(3) Aviation battalions or separate companies.

(4) Engineer units:

(*a*) Engineer combat battalion (army or corps).

(*b*) Engineer construction battalion.

(*c*) Engineer port construction company.

(*d*) Engineer light equipment company.

(*e*) Engineer amphibious units.

(*f*) Engineer mobile assault bridge company.

(*g*) Engineer cellular teams (TOE 5–500-series).

(5) Army intelligence and security units.

(6) Combat service support units as required.

(7) Special forces detachments.
(8) Transportation boat companies.
(9) Provisional air cushion vehicle (ACV) units.

b. U.S. military and civilian advisors to host country governmental, military, and paramilitary agencies and forces may be in the riverine area. These advisors provide a channel for liaison and coordination with host country agencies.

Section IV. NAVAL FORCES

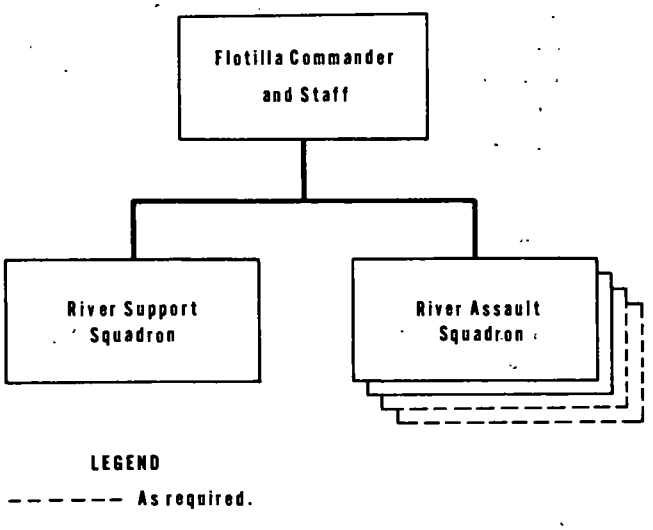


Figure 3–2. Typical river assault flotilla organization.

3–10. General

Naval forces in a riverine environment are organized to provide an afloat base facility and combat and combat service support to Army elements. In addition, Navy elements may patrol and clear inland waterways, conduct amphibious operations and raids, and provide coastal patrol and naval gunfire support.

3–11. River Assault Flotilla

A river assault flotilla (fig. 3–2) consists of a flotilla staff and two or more squadrons.

a. Flotilla Staff. The river assault flotilla staff (fig. 3–3) plans and supervises training and operations; develops doctrine, organizations, tactics, operational procedures, techniques, and equipment for employment in restricted waters, riverine operations, and associated special operations; supervises combat readiness of assigned forces; and advises commanders on all matters concerning other assigned tasks.

b. River Support Squadron. A river support squadron (fig. 3–4) contains barracks, repair, salvage, and supply ships to support Army and Navy elements operating from an afloat base. It provides—

(1) Billets for Army and Navy personnel.

(2) Command and control facilities for flotilla, brigade, and battalion commanders and staffs to include sufficient office space to permit accomplishment of all routine and operational tasks.

(3) Maintenance facilities for Army and Navy units.

(4) Logistic support for Army and Navy units.

(5) Support to base defense forces.

(6) Medical facilities for Army and Navy units.

c. RAS.

(1) An RAS (figs. 3–5 and 3–6) contains sufficient armored troop carriers (ATC), command and communications boats (CCB), monitors, assault support patrol boats (ASPB), and ATC's equipped as refuelers to transport and support a reinforced infantry battalion conducting offensive operations in a riverine environment. The RAS provides—

(*a*) A command and control facility for embarked forces.
(*b*) Gunfire.
(*c*) Combat resupply.
(*d*) Facilities for a floating medical aid station.
(*e*) Ambush defense.
(*f*) Watermine defense.
(*g*) Antiswimmer defense.
(*h*) Harbor security.

(2) Each RAS consists of two river assault divisions, which are administrative organizations. To support combat operations, the RAS commander organizes the squadron into one or more task units (TU) to fill the supported Army commander's requirements.

3–12. Other Navy Forces

Other Navy forces operating in the area normally are not a part of the river assault flot-

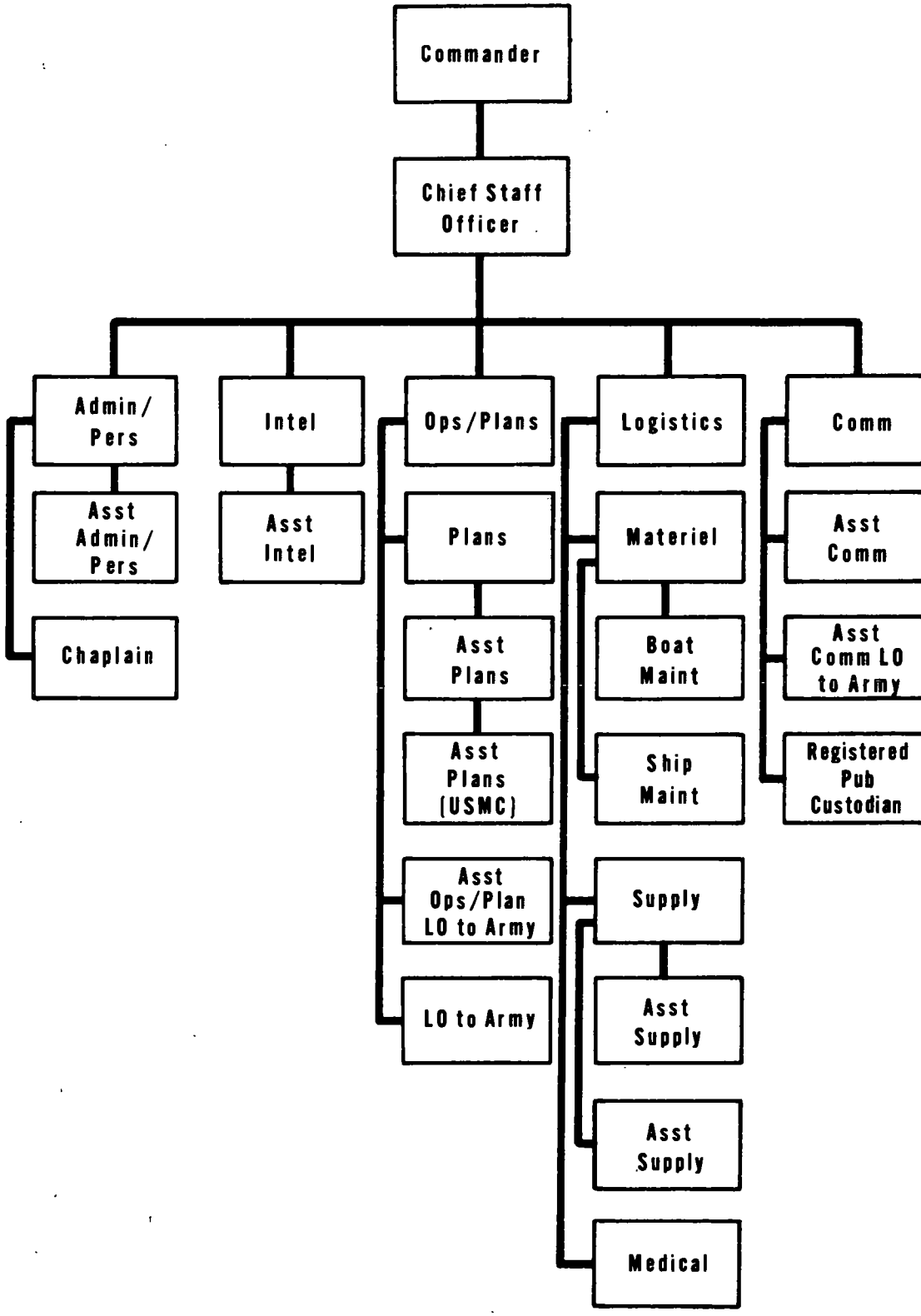
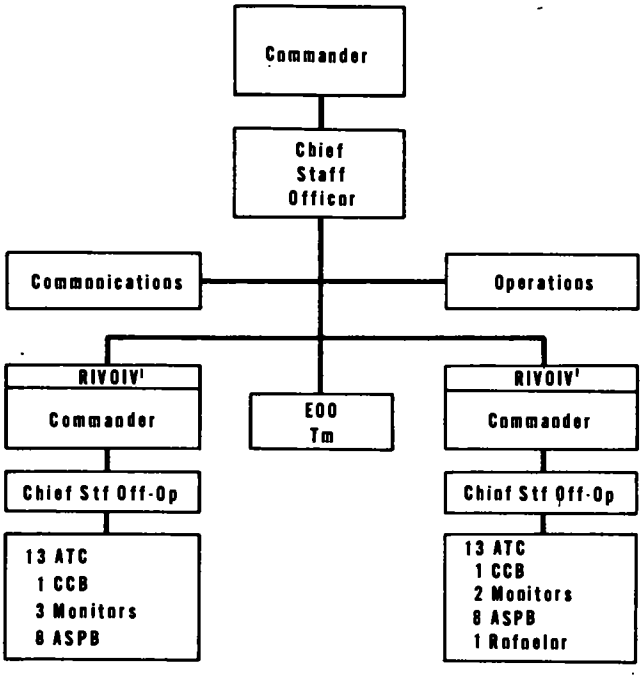


Figure 3–3. Typical organization of river assault flotilla staff.

Designation	*Number*	*Ship/craft type*	*Function*
APB	2	Barracks ship (self-propelled)	Billeting/command
APL	2	Barracks lighter (nonself-propelled)	Billeting
ARL	2	Landing craft repair ship	Maintenance
FDL	2	Floating dry deck (100-ton)	Maintenance
LST	2	Landing ship, tank	Supply
AN	1	Net tender	Afloat base security
YTB	2	Yard tugboat	Salvage; move APL and YFNB
LLC	2	Light lift craft	Salvage
YFNB	1	Covered lighter (large) (nonself-propelled)	Miscellaneous

Figure 3–4. Typical composition of a river support squadron.



¹RIVDIV -- River assault division.

Figure 3–5. River assault squadron organization.
(See app. B, sec. I, for boat nomenclature and description.)

Boat	ATC	Monitor	CCB	ASPB
Crew	7	11	11	7
Billet	Rate	Rate	Rate	Rate
Skipper	BM 1	BMC	BMC or BM 1	BM 2
Coxswain	BM	BM	BM	BM 3
Gunner	SN (2)	GM SN (5)	GM (2) SN (4)	GM FN SN
Engineer	EN (2)	EN (2)	EN (2)	EN
Electronics	RM	RD	RM	RM

BMC—Chief boatswain mate.
BM 1—Boatswain mate first class.
BM 2—Boatswain mate second class.
BM 3—Boatswain mate third class.
BM—Boatswain mate.
EN—Engineman.
FN—Fireman.
GM—Gunner's mate.
RD—Radarman.
RM—Radioman.
SN—Seaman.

Figure 3–6. Composition of crews for boats of a river assault division.

illa; however, they may provide support to elements of the riverine force within their capabilities. Types of forces that may be present are—

a. A waterway patrol unit charged with interdicting enemy LOC along and across major waterways. This unit normally has fast, lightly armored and heavily armed watercraft designed for use on inland waterways. On request, these boats participate in afloat base defense; act as blocking and flanking forces during tactical operations; provide high-speed transport for small Army units; insert, support, and extract long-range patrols; and perform various other tasks within their assigned patrol areas and their operational limitations.

b. An inland waterway mine clearance unit (mine hunters, minesweepers, and ordnance disposal personnel) capable of operating various types of sweep gear in major deep water channels.

c. Coastal patrol units have a variety of ships and craft from destroyers (300 plus feet) down to patrol craft (50 feet or less). The smaller craft can operate in the lower reaches of rivers. Coastal patrol units have a gunfire support capability with weapons ranging from 81-mm mortars to 5-inch naval guns.

d. Amphibious task forces may conduct operations in coordination with riverine operations or may conduct diversionary landings as part of the riverine area campaign plan.

e. Close air support and naval gunfire support may supplement other land-based fire support.

3–13. Navy Riverine Equipment

Appendix B describes Navy ships and watercraft supporting riverine operations.

Section V. AIR FORCE FORCES

3–14. General

Although Air Force forces normally are not a part of the riverine force, within their capabilities they provide close air support, responsive to the needs of the riverine force.

3–15. Airlift and Close Air Support

Airlift and close air support procedures established within the theater of operations apply to riverine operations.

CHAPTER 4

OFFENSIVE OPERATIONS

Section I. GENERAL

4–1. Introduction

a. The concept of riverine operations is the employment of all available forces by all possible modes of transportation to seek and destroy enemy forces or installations (fig. 4–1). Host country forces may establish one or more blocking positions in the area of operations (AO); one portion of the riverine force may enter the area by watercraft; another may employ air assault tactics to enter the area; and a force may move overland, either mounted or dismoutned: all combine to encircle the enemy force in the AO. Once contact has been established, all forces press the enemy and deploy to fix him and destroy him in place. Close airstrikes, air artillery, waterborne and land-based artillery, and gunfire from the supporting naval flotilla support the operation. In addition, the naval flotilla may employ watercraft to establish blocks onexisting waterways in support of the operation.

b. The principles and tactics prescribed in field manuals of the 7- and 17-series, FM 31–16, and FM 61–100 apply to operations in a riverine environment.

c. Offensive operations in a riverine environment are conducted under many different terrain conditions and against enemy forces with diverse capabilities. Successful operations normally depend on the ability of friendly forces to control and coordinate their movements and firepower quickly. Highly mobile maneuver elements and continuous, flexible fire support are indispensable in riverine areas.

d. Army units conducting riverine operations are prepared to counter ambushes, to operate in temporary isolation, and to exploit opportunities with little or no advance warning. All available fire support is used in riverine operations.

e. Airborne forces can be employed year round in a riverine environment, in conjunction with forces moving overland or on water. The terrain may restrict the size of the airborne force employed; however, the procedures outlined in FM 7–20, FM 57–1, and FM 61–100 apply. Based on a map reconnaissance drop zones normally are readily available in a riverine ares. However, their careful selection is preferably based upon aerial reconnaissance necessary because water depth, dikes, canals, and canal banks are hazardous to parachute landing. In inundated areas a parachutist may become entangled in a water-soaked parachute and drown. Poor cross-country mobility in a riverine area restricts heavy-drop and follow-up supply support. The airdrop of small boats facilitates movement ,and resupply.

4–2. Factors Influencing Operations

a. Mobility. All means of mobility are partially restricted during riverine operations. Movement on foot is least desirable for maneuvering forces because it exhausts troops and severely reduces their rate of movement. Movement normally requires a combination of available means of mobility—foot, wheeled or tracked vehicles, boats, helicopters, and fixed-wing aircraft. Exploiting the movement, fire support, and logistic assets of supporting Navy elements significantly enhances Army firepower and maneuver capabilities.

b. Observation. Land navigation and security are critical in riverine areas. All maneuver elements carry colored smoke grenades and signal panels for identification conforms to

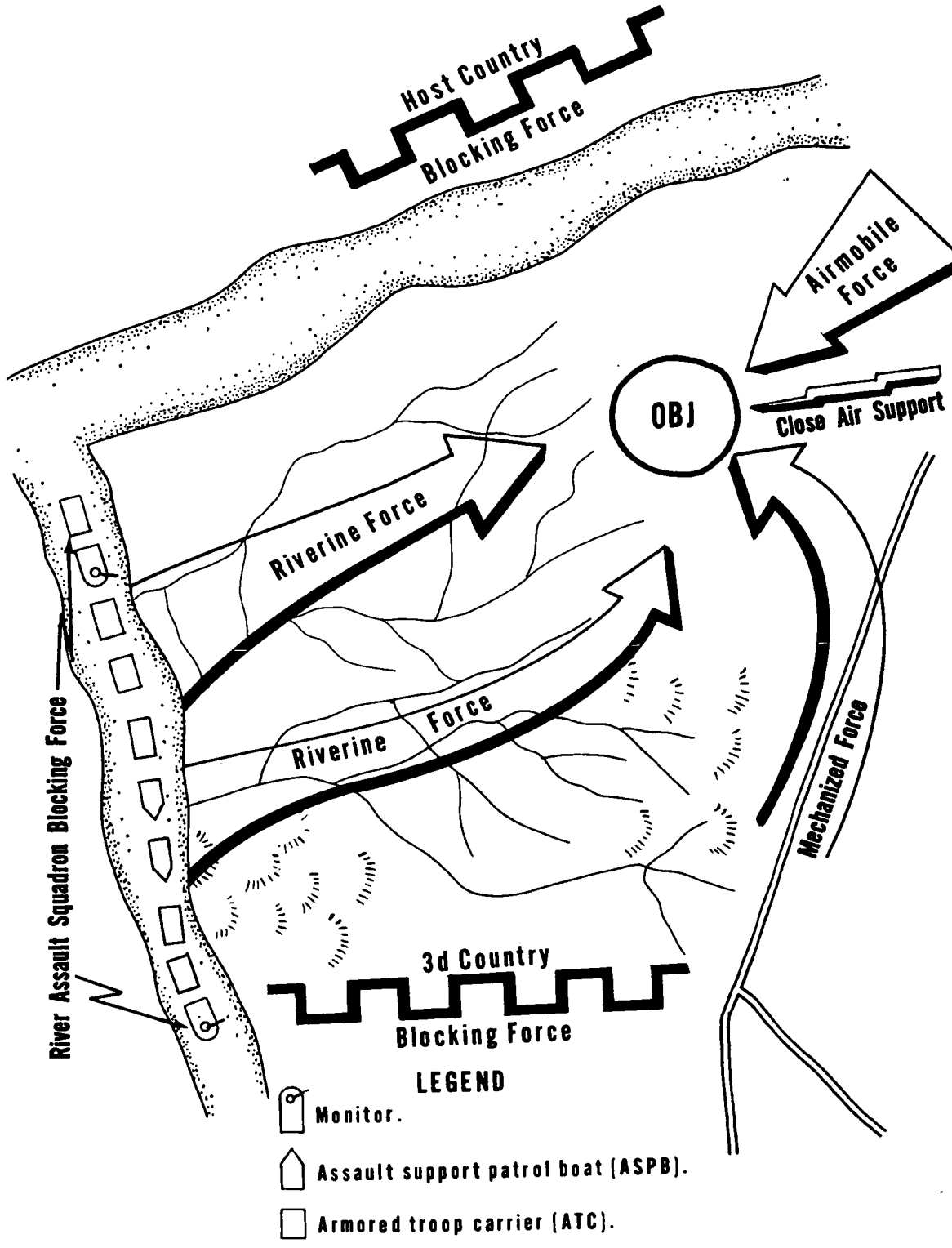


Figure 4–1. Concept of riverine operations.

an SOP that is uniform throughout the sector. Positive identification of all ground markings from the air and subsequent confirmation from the ground are necessary prior to commitment of air support. Aircraft and air observes support maneuver elements by—

(1) Extending the reconnaissance capabilities of the supported units to the front, flanks, and rear.

(2) Detecting and reconnoitering possible ambush sites.

(3) Determining the extent of obstacles and locating bypasses on the route of movement.

(4) Providing readily available fire support.

c. Night Operations. Night actions are feasible in a riverine area. Operations that may be impracticable during daylight may prove highly successful during darkness or limited visibility. Although night offensive operations are less frequent than daylight operations, they are conducted as intelligence dictates or as a follow-on to an operation initiated during daylight. Night operations may be used to gain momentum, to continue the momentum gained by a successful daylight operation, to gain surprise, to cut off withdrawal routes, and to conduct assaults and platoon- and company-size raids. Reconnaissance and close coordination are essential.

(1) Night combat is a part of all operations in riverine environments. All units can conduct night operations using illumination, infrared weapon sights, and other night vision devices. Maximum use of night raids, patrols, and ambushes keeps enemy forces off balance, prevent surprise, and obtain intelligence.

(2) Combat reports state that armored troop carriers (ATC) can move at night without creating excessive noise. Complete secrecy of movement is not possible, but this does not prevent employment of a force, moved by ATC, in night operations.

4–3. Types of Offensive Operations

The mission of all offensive stability operations is to destroy or capture the enemy force or installations rather than to secure terrain objectives. Once in contact with the enemy, the commander must be prepared to alter the existing plan or to develop a new plan to maintain contact until the accomplishment of the mission. Units participating in stability operations in a riverine environment normally conduct operations that support the host country national campaign plan. These operations are consistent with the overall U.S. Army mission of assisting a host country to defeat enemy forces and to gain effective governmental control through internal defense and internal development operation. (See FM 31–16 for additional details.) Types of operations and definitions follow.

a. Search and destroy—This operation supports the national campaign plan to destroy an enemy force, an enemy base, or both. The mission of these operations is to fix the enemy force and destroy it. The force conducting the operation may include mechanized units, waterborne units, units moving overland, air cushion vehicle units, or airmobile units.

b. Search and clear—This operation supports a campaign in a well-defined zone to drive enemy forces from the zone. This mission is usually conducted in coordination with host country military and civil agencies and requires a longer time to complete than search and destroy operations.

c. Secure and occupy—This operation supports a campaign that requires temporary control of designated areas for forward bases. It involves positioning and protecting combat and combat service support units. Troops moving by vehicle, watercraft, helicopter, and/or on foot secure the area.

d. Waterway patrols—This operation (primarily a Navy function) may require Army supporting forces on a periodic or permanent basis to achieve and/or maintain control of designated water routes.

e. Reaction force—Army and Navy elements support host country, other U.S. Forces, or Free World military forces by providing readily available, highly mobile reserves or reaction forces. Mechanized and airmobile units are particularly well suited for this mission. Although their movement is slower, waterborne reaction forces may have greater accessibility to a specific objective than mechanized or airborne forces. Reconnaissance and surveillance are necessary to prevent enemy

forces from ambushing a reserve or reaction force.

f. Route clearance—Land and water routes may have to be cleared for military units or supply convoys. Combined arms teams, including surface and air reconnaissance and engineer support units, and/or paramilitary or irregular units of the host country perform this mission. This mission is coordinated with local U.S. advisors.

4–4. Control Measures

Control measures used in conventional operations are appropriate for use in riverine operations. Because of the habitual employment of searching, blocking, and screening forces, comprising Army, Navy, or host country elements, the positive control of both maneuver and fire support is a necessity. The use of boundaries, phase lines, checkpoints, contact points, coordination points, linkup points, and no-fire lines are part of the unit standing operating procedures (SOP). Control measures that are not a part of, or are in apparent contradiction to, the SOP are confirmed and explained in operation orders.

4–5. Liaison

a. The commander controlling the operation establishes liaison, as appropriate, with the following agencies:

(1) Higher headquarters.

(2) Other U.S. Army elements participating in the operation.

(3) Supporting Navy forces.

(4) Host country military units involved.

(5) Host country civilian organizations.

(6) U.S. advisors to host country military units.

(7) Third country military units involved.

(8) Other governmental and private organizations.

b. Assignment of qualified host country liaison officers to the division/brigade/battalion is essential and is arranged among U.S. commanders, U.S. advisors, and appropriate host country commanders for each operation. The liaison officers' knowledge of the riverine area of operation and the population can assist in identifying friend and foe and can insure close coordination with host country forces. The participation of host country forces in operations at battalion or company is desirable. Their help in searching private dwellings and collecting information can assist in accomplishing the mission.

4–6. Phasing Operations

a. Planning Phase. The impact of tactical operations on the host country authorities and people can be a major factor in planning operations, particularly in densely populated riverine areas. Desired military results are achieved with the least possible damage or destruction of property or death to civilians.

(1) Because most riverine operations involve at least two Services plus host country forces, parallel and coordinated planning is required at all echelons. This planning expedites the development of supporting plans and the preparation of units for the operation. Initial coordination between participating elements begins on receipt of warning orders. Coordination and liaison between units insure the establishment of common goals to accomplish the mission.

(2) Alternate plans are habitually developed to take advantage of opportunities that the force creates in the AO or to counter unusual, unsuspected enemy actions or reactions. Other alternate plans provide for changes in water or airlift capabilities and in the availability of fire support.

(3) Deception plans are necessary to offset the almost certain disclosure of unit movements away from and back to riverine bases. The commander considers the known capabilities of enemy forces to detect and transmit movement information, in preparing the deception plan.

b. Staging and Loading. The staging and loading of the forces for movement to an AO are characteristic of waterborne, airmobile, and airborne operations. Elements, either dismounted or mechanized, may require staging if they are being transported by water or air from one location to another. Security precautions are necessary during the staging and loading phase to prevent enemy forces' being alerted to either the AO location or routes to it. Security precautions and deception plans are implemented concurrently.

c. Movement Phase.

(1) *Methods of movement.* Navy watercraft, Army assault boats, helicopters, armored personnel carriers (APC), trucks, fixed-wing aircraft, air cushion vehicles (ACV), and foot marches may move committed forces to the AO. Movement may start either a base area or an AO currently occupied.

(*a*) *Navy watercraft.* The river assault squadron (RAS) is organized and equipped to move a reinforced infantry battalion either into an AO or into a forward staging area for movement into the AO. The RAS also provides boats for command and control, fire support, patrol/blocking, and minesweeping.

(*b*) *Army assault boats.* These boats perform a variety of military tasks; however, they are not satisfactory in an assault role. Their use may be limited to administrative roles where the lines of communications (LOC) are relatively secure.

(*c*) *Helicopters.* Helicopters offer a rapid, flexible means of movement into and within the AO. Many staging areas and landing zones are available throughout a riverine area.

(*d*) *APC's.* Experience indicates that APC's can traverse most of the riverine area with considerable freedom when moving over carefully selected routes. They can move fast and still retain unit integrity. Movement may begin from a land base or an existing AO or may follow preliminary positioning by naval craft.

(*e*) *Truck.* Truck movement is practicable along the major roads in a riverine area. Ferrying operations may be required, however, for trucks or troops. When ferries are not available or are unreliable additional trucks are required on the far side of the waterway to continue the movement. Route reconnaissance, including possible minefields and ambush sites, bridges, and ferries, is necessary. Sufficient assault boats are carried on the trucks to provide another crossing means when ferries are inoperable or ferry sites are congested with civilian traffic.

(*f*) *Fixed-wing aircraft.* Airborne forces can be employed year round. Fixed-wing aircraft may transport forces between base areas and forward staging areas.

(*g*) *Airboats.* These boats are fast, are maneuverable, and can traverse shallow waterways containing dense grasses.

(*h*) *ACV.* The ACV is fast and can traverse land, water, and swamp areas with ease. It also has an excellent ditch-crossing capability.

(*i*) *Foot marches.* Foot marches are necessary when other transportation is neither available nor feasible. Normally, foot movement is restricted to short marches and follows initial deployment by other means.

(2) *Prepositioning.* On occasion, because of insufficient lift capability, part of the fire support elements or the combat service support elements may deploy to the AO in advance of the maneuver elements. Planning and movement requirements for prepositioned elements are similar to maneuver elements and primary forces. Once in position, prepositioned elements can provide security for movement of other elements, assist reaction forces, block enemy LOC, execute contingency plans, or participate in deception operations.

(3) *Security during movement.*

(*a*) The security of moving elements is a primary consideration when planning movement. All routes are subject to interdiction; and any means of transport, except aircraft, is subject to ambush. Threats to unit movements include mines, roadblocks, ambush, sniper harassment, indirect fire, and involvement in a meeting engagement. Reconnaissance and security elements precede movements. Prior to movement the element is thoroughly briefed on plans for security, to include communication security with emphasis on SOP measures for counterambush. An air escort accompanies unit movements to provide reconnaissance, fire support, and communication relay.

(*b*) Moving units into an AO without disclosing the forthcoming operation is a major problem; therefore, forces should either use indirect routes into the AO or move at night. Once enemy forces know the location of the AO, they may disperse to avoid close combat.

(4) *Coordination and control.* Detailed coordination is necessary when multiple means transport elements to the AO. Communications with all moving elements and specified reporting procedures are necessary to enable the control headquarters to monitor the progress

of the move and to have adequate information on which to base decisions affecting the movement.

d. Scheme of Maneuver. An aggressive offense attains and maintains the initiative.

(1) Offensive actions normally are cross-country movements toward suspected enemy locations or installations. These movements are concurrent with the deployment of blocking forces and supporting units.

(2) Standard formations apply for movement within the riverine area.

(3) The following actions are necessary once contact is established:

(*a*) Determine the strength and disposition of the enemy forces while maintaining contact.

(*b*) Gain fire superiority to permit freedom of maneuver.

(*c*) Deploy forces to prevent enemy escape or withdrawal. Waterways frequently are used to deploy naval and ground forces to accomplish this mission. The RAS can provide blocking forces by using organic watercraft to block navigable waterways in the area. The host country may participate in the operation by providing maneuver elements or blocking forces. When elements of the riverine force are prepositioned in a blocking role, the enemy will be aware of an impending operation.

(*d*) Make maximum use of fire and maneuver to destroy or capture enemy forces. Plans provide for maximum employment of fire support to destroy the enemy on contact. If maneuver elements immediately close with the enemy and attempt to destroy him in close combat, safety considerations for friendly troops may prevent maximum employment of available firepower.

(*e*) Pursue enemy forces attempting to infiltrate through the blocking forces. Security of the movement is essential to protect pursuit forces from ambush. The ACV is particularly well suited to conduct pursuit operations either as a combat vehicle or troop transporter.

(4) A reaction force, as well as fire support elements, may occupy dispersed assembly areas. Each element collocates with its means of transportation to provide for rapid commitment. Means of transportation vary with the location of assembly areas and planned commitment. Fast reaction is essential to success.

e. Withdrawal and Return Movement.

(1) A withdrawal in a riverine environment, in which all or part of a deployed force discontinues operations and moves to another location by watercraft, requires detailed planning. Enemy forces usually have precise information on the location of friendly units and their composition and relative combat power. Plans for the withdrawal insure air and fire support throughout the withdrawal operation. Procedures outlined in FM 7–20 apply to withdrawal before embarking; they apply generally to subsequent phases of the withdrawal.

(2) Forces withdrawing from an AO use all available means of transport.

(3) Close supervision is required to prevent laxity in units preparing for withdrawal and during return movements. Ambush is very likely to occur during the return movement; therefore, where possible, units select different routes for withdrawal from those used in movement to the AO.

(4) Considerations peculiar to waterborne withdrawal follow:

(*a*) Planning procedures include consideration of tide and current information. Hydrographic factors controlling employment of RAS watercraft may require reverse planning procedures because of favorable tide and current conditions.

(*b*) The characteristics and limitations of watercraft affect the achievement of security and secrecy during the waterborne withdrawal. Increased emphasis on deception and active security is required. When feasible, RAS craft continually patrol the water withdrawal route to deter ambush and mining attempts.

(*c*) Ambush parties, deployed similarly to detachments left in contact, may use a waterborne withdrawal as a lure to destroy enemy forces. The withdrawing force becomes a reaction force familiar with the AO.

Section II. DIVISION/BRIGADE OPERATIONS

4–7. Characteristics of Operations

Operations in a riverine environment usually differ from those in conventional operations and environments as follows:

a. Extreme climatic conditions have a detrimental effect of equipment. Frequent vehicular cross-country movement with the suspension systems submerged in water, particularly salt water, shortens the life of all parts with rubber components. Prescribed load lists (PLL) provide increased quantities of all track and suspension system components. Equipment requires lubrication after each operation. Weapons also require frequent oiling to protect them from moisture. All types of seals deteriorate rapidly and require frequent inspection to insure replacement at the first indication of failure. Communications equipment is dried in the sun at every opportunity. Electronic equipment requires daily preventive maintenance.

b. A division operating in a riverine environment normally is assigned a tactical area of responsibility (TAOR). Host country forces may retain responsibility for insuring governmental control of the area. Division units can expect to conduct operations in specified AO's for prescribed periods. The size of the AO and the duration of operations therein are determined by the factors of mission, enemy, terrain and weather, and troops available (METT). AO's may vary in size from a few square kilometers up to 150 square kilometers. Operations within them may last from a few days to several weeks. In operations of longer duration, rotation of maneuver units is essential to the maintenance of combat effectiveness.

c. Division and brigade commanders have the opportunity to employ considerable combat power using watermobile and airmobile means of transportation as well as overland movement. The exploitation of all available means of transportation is a key factor in planning and conducting riverine operations. Exploiting the firepower and logistic assets of Navy elements significantly improves Army firepower and maneuver capabilities . These Navy assets are aids to success in actions against enemy forces and their installations in a riverine area.

4–8. Conduct of Operations

a. Division operations may consist of the entire division committed to a single operation or a series of brigades or battalions independently conducting operations. The division commander maintains a reserve, or reaction force, varying in size from a single battalion to a brigade.

b. In riverine operations the basic forms of offensive maneuver, frontal attack, penetration and envelopment, evolve into an encirclement or a series of encirclements. Elements subordinate to the headquarters controlling the operation may use variations of the basic forms of maneuver to accomplish their mission (fig. 4–1).

c. Airmobile operations in a riverine area generally follow the established doctrine in FM 7–20 and FM 57–35. Airmobile operations are used to commit maneuver elements, blocking forces, reserves, and reaction forces.

(1) Although riverine areas may be widely inundated during the wet season, airmobile operations are feasible year round. Care must be taken to prevent off-loading troops into concealed canals. Airmobile operations in forested areas or swamp areas with heavy vegetation may be limited to employment of troops trained in rappelling or to the use of landing zones adjacent to the forested area.

(2) Weather, temperature, and humidity in the riverine environment affect the lift capability of helicopters. For example, during a late afternoon extraction, high temperature, humidity, or high grass or vegetation may necessitate a reduction of loads by one or two men because the lift capability is reduced.

(3) Although not required, moving the elements to be lifted to a preselected loading zone near the AO by boats, vehicles, or fixed-wing transport aircraft may be advantageous. This method of insertion into the AO reduces the distance that helicopters must move troops and deploys more troops into the objective area faster, without refueling.

(4) The Army is developing an air-transportable platform for use in loading and unloading troops from helicopters in rice paddies, swamps, and shallow water. The 20-foot-diam-

eter hexagonal platform is constructed of aluminum tubing surfaced with aluminum chain-link fencing. Six 20-foot-long legs attached to a steel wire net serve as a base for the structure. The platform weighs 950 pounds and can support 9,500 pounds on marsh or rice paddy areas or 4,000 pounds on jungle foliage.

4–9. Employment of Reaction Forces

a. Because the enemy normally chooses to fight only when he thinks he can inflict heavy casualties, rapid response by reaction forces is essential. Reaction operations require flexibility, careful planning, coordination, and reliable communications between all elements. Reaction forces meet established reaction times through planning, rehearsals, and prepositioning.

b. The commander must insure that a valid requirement for commitment of the reaction force exists before he requests or commits it. A division reaction element may have a mission to be prepared for commitment within the TAOR, or in support of brigade operations in an AO. A brigade reaction element normally is prepared for commitment within the AO, only. Airmobile reaction forces can deploy directly against located enemy positions. Elements on airborne alert are expensive in terms of resource expenditure; therefore, their use is infrequent. An operation may require a small reaction force, normally company size, to be aloft during the critical stages of the operation. This force normally provides the most responsive reaction force. Waterborne reaction forces embarked in ATC's frequently can be available for rapid and effective commitment in a riverine environment. Reaction forces, in the desired condition of readiness, are in assembly areas, either at land bases or at afloat bases, with a suitable landing area nearby. To facilitate immediate employment of the reaction force, the commander completes all possible preparations in advance.

4–10. Armored Cavalry Operations

a. General. The armored cavalry squadron performs reconnaissance and surveillance missions and provides security for the unit to which assigned or attached. This squadron rarely conducts independent offensive operations in a riverine area. The squadron and its troops may be employed in support of waterborne elements or elements moving overland. When the employment of an armored cavalry troop with a brigade is necessary, the armored cavalry squadron is normally given a mission to support the brigade with a troop, rather than to attach a troop to the brigade. The air cavalry troop remains under squadron control to extend the capabilities of the ground troops.

b. Missions. The armored cavalry squadron or troop (waterborne or in a ground role) can perform reconnaissance and security missions for a larger force. Additional missions within the squadron's or troop's capability include convoy security and, airfield security, land or afloat base security.

c. Armored Reconnaissance/Airborne Assault Vehicle.

(1) The armored reconnaissance/airborne assault vehicle (ARAAV) is an air-transportable tank, which can be air-landed or air-dropped into an AO. This mobility provides combat power that can be deployed rapidly for riverine operations. The vehicle's swim capability, speed, and maneuverability provide a cross-country trafficability similar to an APC. It may be employed with waterborne or overland elements.

(2) The ARAAV replaces the light gun tank in armored cavalry squadrons and the main battle tank in tank battalions.

d. Air Cavalry Troop.

(1) The air cavalry troop complements the capabilities of the armored cavalry troop during reconnaissance, surveillance, and security missions in a riverine area. This troop may conduct independent reconnaissance and surveillance, reaction force, raid, air patrol, or counterambush missions.

(2) When maneuver units are not available for use in blocking positions, air cavalry scout platoons can observe possible enemy escape routes; air cavalry infantry and weapons platoons can be used to block these routes.

4–11. Tank Battalion

a. General. The tank battalion is equipped with the ARAAV instead of the main battle tank (para 4–10*c*). The tank battalion may be employed independently; however, normally cross-attachment between the tank battalion

and mechanized infantry battalions is accomplished to form tank-infantry teams and task forces. The tank battalion may be employed with a waterborne force or an overland force. The force may be transported in Navy craft for waterborne operations; or, the combat elements may be waterborne using vehicular swim capabilities with the logistic elements being transported in Navy craft. Whether the tanks swim or are transported by Navy craft depends on the distance.

b. Missions. The tank battalion can conduct raids and perform missions as a reaction force, an encircling force, an assault force, and a counterambush force.

Section III. BATTALION OPERATIONS

4–12. General

a. Introduction. This section provides guidance to infantry battalions and subordinate units in planning and conducting waterborne operations. The operations outlined in this section describe only one of the many ways that watercraft can increase battlefield mobility in a riverine environment.

b. Concept of Waterborne Operations.

(1) Units conducting riverine operations use water transport extensively to move troops and equipment throughout the area. Waterborne operations normally start from areas where ground forces and naval watercraft marshal and load and where forces can effect coordination. This may be at a land base adjacent to a navigable waterway, at an afloat base on a navigable waterway, or in an existing AO. Once troops are aboard, the watercraft proceed to designated landing areas within an assigned AO for offensive operations.

(2) Unit plans include control measures, such as phase lines and checkpoints, for the entire operation. The commander controls the unit's movement either from a command and control boat (CCB) located within the movement formation or from an airborne command post. Maneuver unit commanders embarked in command and control craft dismount from these craft to influence the action of their units.

(3) Security measures employed during the water movement include watercraft formations, constant water patrolling, ground patrolling when possible along the route, air observation, and column cover with armed aircraft. Close air support aircraft on air or ground alert, artillery, and naval gunfire ships or boats provide fire support. The monitors and assault support patrol boats (ASPB) are the primary source of RAS fires. Maneuver elements and Navy watercraft prepare to carry out counterambush attack plans at any time during the movement.

(4) The assault landing formation is consistent with the planned scheme of maneuver. Initial objectives are designated to provide security for the landing area and to facilitate assembly and reorganization of units. Each ATC normally transports one full-strength rifle platoon; this maintains unit integrity and simplifies assembly and reorganization. When the landing is not opposed, the units move rapidly through the initial objectives. Units prepare to accept combat at any stage of the landing. RAS boats provide supporting fires to the flanks and rear, as well as to the front of the maneuver units. The assault landing plan includes preparatory and on-call supporting fires.

(5) The commander initiates a movement to contact when the assault landing is complete, the initial objectives have been secured, and the reorganization of the unit is complete. He uses encirclement and surprise to fix the enemy force and to prevent its withdrawal, and he employs firepower to destroy it.

(6) Navy watercraft and Army assault boats are used to accomplish a variety of missions. CCB provide communication facilities for command echelons to control the riverine force when it is away from the land or afloat base. Monitors provide both direct and indirect fire support to the riverine force in base areas, during movement, and land operations. Primary missions of ASPB include security in base areas and fire support and armed escort during movement and operations. Army assault boats support the operation by maximum use of existing waterways.

(7) The combat base for the waterborne battalion may include both water and land

areas. This base normally includes those support elements of the maneuver battalion and the Navy RAS not used with forward tactical units and Army and Navy command and control elements. The battalion combat base moves as required to control and support the operational elements. The size of the AO or the lack of waterways deep enough for RAS craft may prevent the battalion combat base from moving as close to forward elements as necessary for command and control. In this case, the unit commander establishes a tactical command post and follows the operation on foot or by Army assault boat or helicopter.

(8) Dismounted troops carry only essential equipment as they wade through knee-deep mud and waist-to-chest-high water. The battalion may use supporting weapons and equipment in the battalion combat base areas. Assault boats, other watercraft, or helicopters deliver these weapons and equipment to maneuver elements. Assault boats transport these items when the route is relatively secure.

(9) Individual morale and alertness decrease markedly after about 48 hours of continuous operations in inundated areas. Rotating units not only helps to overcome this problem but also helps to alleviate the effects on personnel of immersion foot and fungus infection of the feet. Units withdraw by watercraft or other means, according to plan. The withdrawal of troops from the AO is a tactical movement back to the watercraft loading areas. Units are loaded in reverse sequence to that used in the waterborne assault landing; e.g., artillery normally lands last and loads first in withdrawing. Security of the loading area is necessary throughout the withdrawal operation. A tactical water movement back to base areas or to another AO follows the loading.

(10) Plans allow sufficient time between operations for troop rest, medical attention, equipment maintenance, training to correct deficiencies, and planning for future operations.

(11) Units can maintain secrecy and deceive enemy forces by loading under concealment of darkness and moving in a direction other than toward the designated AO. Later, the boats can reverse their course and, moving at full speed, arrive at the landing site before the enemy force can react. This technique helps provide surprise, which is essential in riverine warfare.

c. Task Organization. Waterborne operations require the integration of appropriate Army and Navy forces at each echelon. The task organization integrates battalion with RAS, company with boat division, and platoon with boat. Commanders at each echelon base their actions and orders on the command relationship prescribed in orders from higher headquarters (para 3–4 through 3–7). The battalion requires the following information to determine the required naval support:

(1) The ability of naval watercraft to move to, within, and around the AO.

(2) The maneuver elements needed in the AO and the availability and desirability of other means of transport to deliver them.

d. Preparation for Waterborne Operations.

(1) Waterborne operations require detailed planning at all levels and close coordination with a supporting naval RAS.

(2) Units conducting waterborne operations must be ready to begin the operation as soon as possible after receiving orders. Assault boat operators require training in operation, maintenance, and navigation. The use of RAS craft for movement to the AO reduces the training requirement for assault boat operations. As a minimum, training consists of briefings in the marshaling or staging area to acquaint Army personnel with embarkation/loading procedures, required action during the water movement, and debarkation/landing procedures.

(3) The following measures are necessary to maintain unit readiness:

(*a*) Maintain a detailed unit alert and marshaling plan and prepare to execute the plan without delay.

(*b*) Prepare supplies and equipment for immediate loading aboard watercraft in accordance with established load plans.

(*c*) Issue necessary supplies and special equipment to personnel.

(*d*) Maintain current SOP loading plans for types of watercraft used.

(*e*) Maintain part of the authorized supplies and heavy equipment and part of the unit basic load of ammunition aboard watercraft when possible.

(*f*) Conduct frequent inspections, checks, and rehearsals.

e. Plans and Orders.

(1) *Warning order.* The commander issues a warning order early in the planning phase to enable subordinate unit commanders to begin planning and preparing for the operation concurrently. The warning order for a waterborne operation is a brief oral or written message and generally contains the information necessary to start preparations. It may include—

(*a*) Data on marshaling or staging, including security measures to be adopted during this phase.

(*b*) Information concerning the number and type of watercraft allocated to each subordinate unit.

(*c*) Approximate time and date of movement and planned length of operation.

(*d*) Waterborne route, if known.

(*e*) Information on the AO.

(2) *Operation order.* An operation order that includes the commander's concept of the operation and specific tasks to subordinate elements follows the warning order. At battalion, this order may be oral or written.

f. Marshaling Security.

(1) The time for planning and moving a waterborne force to its AO may vary from several hours to several days. When friendly security measures are lax, the enemy force in the AO may have sufficient time to take evasive action and to prepare defensive positions or ambushes along the planned route.

(2) The necessity for secrecy in planning and conducting a waterborne operation calls for strict security measures early in the planning stage to prevent the enemy's gaining knowledge of the operation. Only those personnel who have a need to know are informed of a scheduled waterborne operation until all personnel are in the marshaling area and restricted to it. Preparation, training, and rehearsals during marshaling appear routine. Periodic practice seal-in alerts accustom the local populace to conditions that exist during marshaling for actual operations.

(3) When operating from an afloat base, there is no requirement for marshaling because the entire force lives aboard watercraft.

4–13. Planning Waterborne Operations

a. General. Plans for waterborne operations are detailed enough to give all participants complete information but simple and flexible enough to be modified as the tactical situation changes.

b. Planning Sequence.

(1) Plans for a waterborne operation are usually developed in the following sequence:

(*a*) *Scheme of maneuver* based on the mission, troops available, and intelligence concerning the enemy force and terrain, and includes withdrawal.

(*b*) *Assault plan* based on the scheme of maneuver.

(*c*) *Water movement plan* based on the assault plan and the scheme of maneuver.

(*d*) *Loading plan* based on the water movement plan, the assault plan, and the scheme of maneuver.

(*e*) *Marshaling plan,* when required, based on the loading plan, the water movement plan, the assault plan, and the scheme of maneuver.

(*f*) *Deception Plan,* when required, based on the mission.

(2) Although these various plans usually are discussed separately, at brigade and battalion they are prepared as paragraphs of the operation order. Planning follows the sequence indicated above, but the plans are interrelated and are developed concurrently. Combat support and combat service support planning begins with the scheme of maneuver and continues throughout the planning sequence.

c. Scheme of Maneuver.

(1) The scheme of maneuver is the phase of the operation that starts after the initial objectives in the landing area have been secured and includes those operations necessary to complete the mission. It may include displacement and linkup with other forces. Withdrawal is planned together with the scheme of maneuver. It may be either a part of the operation order or a separate order.

(2) The scheme of maneuver prescribes a task organization; assigns missions, objectives as appropriate, boundaries, and other control measures; and provides for a reserve. It takes into consideration those special factors or features as inundated land, use of sup-

porting watercraft, use of fire support, and close air support.

(3) The scheme of maneuver of a waterborne force is planned to seize the initiative and to force the enemy to react to the operation. Maneuver elements use waterborne capabilities of the RAS to the maximum in moving to the AO, attempting to encircle the enemy prior to landing, deploying blocking forces, emplacing artillery units, providing supplies in the AO, and other combat service support missions. The primary objective is still the enemy force, not the terrain.

(4) The scheme of maneuver is designed to encircle a suspected enemy force in the AO. Terrain objectives are selected which block escape and permit fixing of the enemy force so that it can be destroyed.

(5) Plans insure that units maintain pressure on the enemy, once contact is made. Forces are deployed rapidly to fix the enemy force in a position where maximum fire support can assist units to close with and destroy or capture the enemy force.

(6) Units use waterways to the maximum possible within the AO to capitalize on supporting watercraft capabilities.

(*a*) Navy RAS watercraft operating in close support of the maneuver elements can—

1. Transport and support ground troops in the assault.

2. Act as, or in support of, a blocking force.

3. Conduct reconnaissance, security, and combat patrols.

4. Transport and land a raiding force.

5. Displace crew-served weapons.

6. Transport reserves.

7. Perform resupply and evacuation tasks.

8. Serve as a command or utility vehicle.

9. Serve as a mobile aid station.

10. Provide direct and indirect fire support.

11. Withdraw or redeploy troops.

12. Act as a firing platform for 105-mm howitzer or 81-mm mortars.

13. Evacuate prisoners of war (PW), defectors, and detainees.

14. Perform damage control and salvage.

15. Provide maintenance and repair of watercraft.

(*b*) As described in appendix B, the waterborne force may employ Army assault boats to—

1. Position blocking forces.

2. Displace crew-served weapons.

3. Provide a means of moving either between naval craft or between naval craft and shore when waterway conditions prevent the landing of troops directly from the naval watercraft.

4. Conduct medical evacuation.

(*c*) Employment of ACV.

1. The ACV's high speed, together with its capability to travel over water and land, makes it especially suitable for employment in support of operations on waterways and inundated or partially inundated areas. Its ability to traverse dry land allows this vehicle to retain high mobility during dry seasons while watercraft are restricted to perennial waterways.

2. Missions or tasks for which these vehicles may be used in support of operations include—

(a) Flank guard or screening.

(b) Area reconnaissance.

(c) Route reconnaissance.

(d) Blocking forces.

(e) Reserve or exploitation force transportation.

(f) Enemy watercraft interception.

(g) Mobile command post for command and control.

(h) Resupply of critical items and emergency medical evacuation.

d. Waterborne Withdrawal.

(1) During preparation for the waterborne operation, planners determine the availability of waterways in the AO, tide and current information for the scheduled period of operations, and suitable loading sites. This information, kept current during the operation, provides the basis for planning the waterborne withdrawal.

(2) Active employment of watercraft during offensive maneuver simplifies deception in the initial stages of a waterborne with-

drawal. The quantity of hydrographic information available increases as a result of this employment.

(3) When possible, waterborne withdrawal is timed to allow watercraft to approach loading areas with the current, on the rising tide; to load during slack high water; and to depart with the current, on the falling tide.

(4) Because of the security problems that accompany large waterborne movements and the use of predictable routes, loading during the last hours of daylight and moving under the concealment of darkness should be considered. Moving reconnaissance elements along possible withdrawal routes several hours ahead of the movement group is a useful deceptive measure.

(5) Loading, normally the most critical phase of the withdrawal, requires detailed planning in the selection of troop assembly areas, loading areas, loading control measures, and watercraft rendezvous areas.

(6) Size of the force to be loaded, personnel training, and time available determine the detail necessary in the withdrawal plan. Routine loading instructions are included in unit SOP. Withdrawal plans also include—

(*a*) Schedule for movement of units to loading areas.

(*b*) Schedule and priorities for loading.

(*c*) Designation of loading areas and loading sites.

(*d*) Designation of and instructions for loading control personnel.

(7) The highest headquarters involved in the withdrawal designates loading areas. These areas are as close to unit positions as the waterways, terrain, and enemy situation permit. Multiple loading areas are desirable to achieve maximum speed in loading and departure and to provide passive protection against enemy actions. Factors for consideration in selecting the location and number of loading areas include—

(*a*) Loading area requirements for the types of watercraft to be used.

(*b*) Number of watercraft and time needed for loading.

(*c*) Availability of facilities for improving loading areas.

(*d*) Availability of watercraft control facilities.

(*e*) Availability of dispersed loading sites and standby maneuver area for ATC's.

(*f*) Protection from enemy observation and fires.

e. Assault Plan.

(1) The scheme of maneuver is the basis for the assault plan. The assault plan designates the sequence and the time and place of landing of maneuver, combat support, and combat service support units in the landing areas; securing initial objectives; and reorganization of the unit.

(2) Landing areas are selected to avoid prepared enemy defensive positions. The RAS commander provides recommendations for tentative landing areas and alternates, when practicable. Planners must assume that the assault landing will be opposed. Figure 4–2 shows an assault plan diagram. The following influence the selection and the location of landing areas:

(*a*) Scheme of maneuver.

(*b*) Mission and size of the waterborne force.

(*c*) Enemy situation and capabilities.

(*d*) Available landing areas and individual watercraft landing sites within these areas.

(*e*) Requirement to land the reconnaissance platoon or similar size unit on the opposite bank of the waterway to provide rear security from the "far bank."

(*f*) Capabilities and limitations of watercraft.

(*g*) Characteristics of the waterways and adjacent land areas.

(3) When landing sites within the landing area are insufficient or inadequate, several elements may use the same site, landing in turn. When using a single landing site, maneuver units are landed first, combat support elements next, and combat service support elements last.

(4) The commander may recommend a time for landing if more than one battalion is participating in the operation, or he may select the time for landing when the battalion or its elements are conducting an independent operation. In recommending or selecting the time for landing, the commander considers enemy dispositions and capabilities; the influence of predicted weather, tides, and visi-

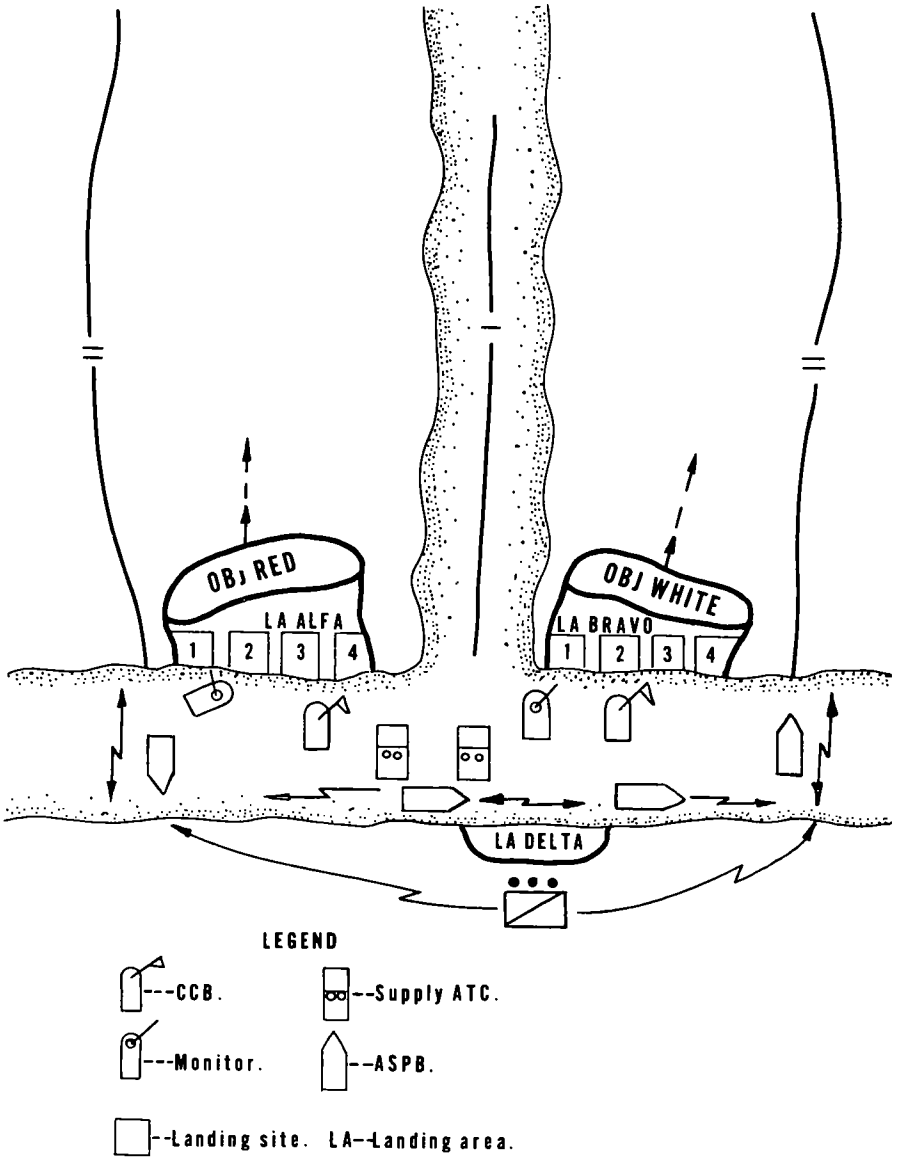


Figure 4-2. Assault plan diagram.

bility, both day and night; the number and type of watercraft being used; the availability of fire support; and the plan for supporting fires.

(*a*) Units may land at first light to take advantage of darkness during the water movement and to begin the subsequent operation in daylight. They may land and reorganize immediately before darkness and then begin the subsequent operation during darkness. Waterborne landings during daylight present fewer command and control problems, can be more complex, and can be better supported by the RAS and close air support.

(*b*) Units may land at night or under conditions of reduced visibility to gain surprise and to reduce the effectiveness of enemy fires. Landings under these conditions have the following limitations:

1. Accurate delivery of units to their landing area is more complicated.

2. Air, RAS, and artillery fire support may be less effective.

3. Reorganization and securing of initial objectives in the landing area may be more difficult and time consuming.

4. Danger from navigational hazards increases.

(5) The landing phase is critical. Maneuver and combat support elements debark as rapidly as possible and secure the initial objectives. Although the securing of initial objectives provides only a momentary pause for assembly and reorganization before subsequent operations begin, all units attain and maintain a combat posture. Each element is prepared to contribute its combat power in a coordinated effort to secure the landing area. Figure 4–3 depicts a typical landing formation. Initial objectives provide—

(*a*) Cover and concealment from enemy observation and fire.

(*b*) Sufficient size for dispersion.

(*c*) Proximity to landing areas.

(*d*) Desired dispersion of subordinate elements to conduct the subsequent operation.

(*e*) Ease of identification.

(6) Although assembly and reorganization are less complicated than in airmobile or airborne operations, some assembly aids may be used. These assembly aids include panels, colored smoke or other pyrotechnics, colored lights, radio homing devices, audible signals, and distinctive markings on clothing and equipment.

f. Water Movement Plan.

(1) The water movement plan, prepared by the supporting Navy commander when RAS watercraft are used, is based on the landing plan, which, in turn, is based on the scheme of maneuver. This plan includes the composition of the waterborne force, the organization of movement serials, the formation to be used, movement routes, command and control measures, security measures, mine countermeasures, plans for fire support and immediate reaction to ambush.

(2) A water movement is planned as the approach march phase of a movement to contact and normally uses Navy watercraft as the means of transportation. During planning, the commander considers that—

(*a*) An RAS can provide sufficient watercraft to move a reinforced infantry battalion. Other naval ships and craft, not nor-

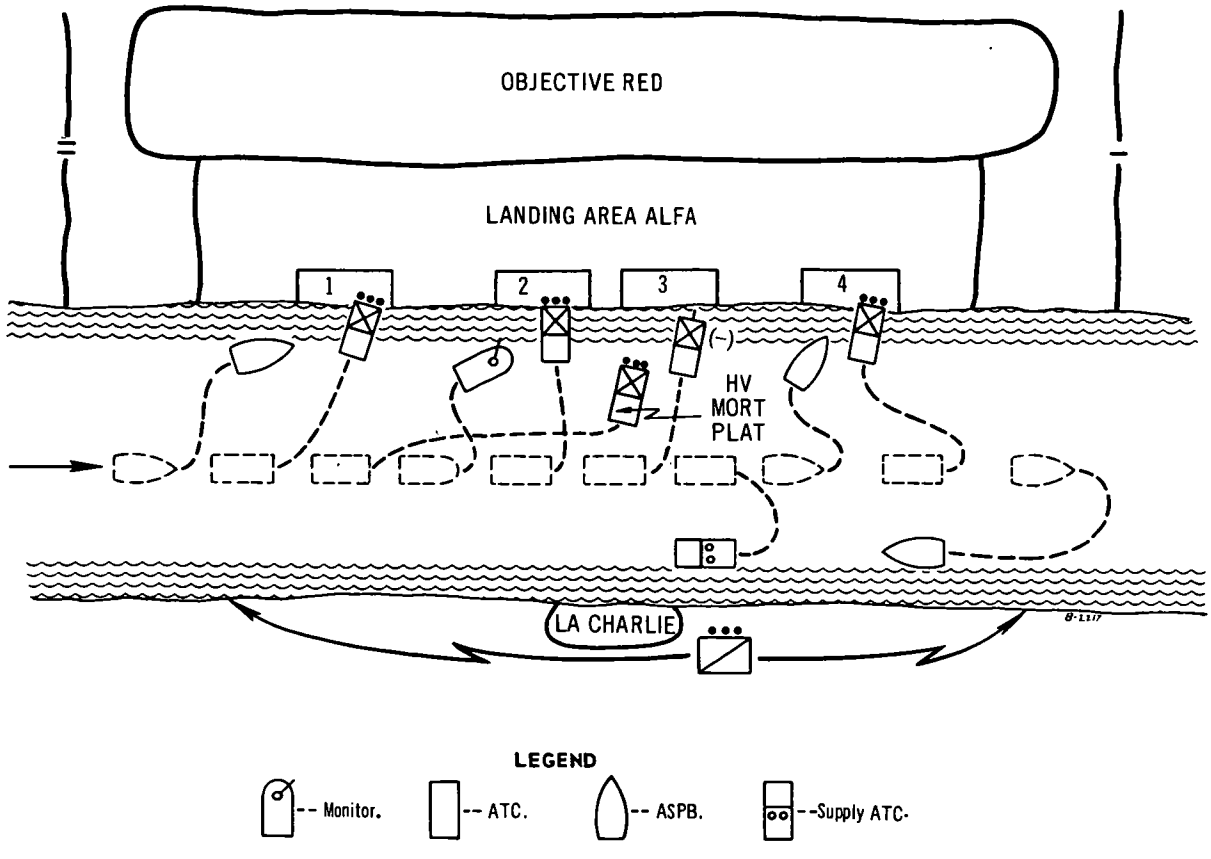


Figure 4–3. Typical landing formation.

mally a part of the RAS, may be available for as specific operation. Appendix B contains details on naval watercraft characteristics and capabilities.

(*b*) Army assault boats can provide mobility for a reinforced infantry battalion employed as a waterborne force. Although assault boats can traverse waterways not navigable to RAS craft, they are susceptible to enemy action and should not be used in the assault except in emergencies.

(3) The water movement order is issued to subordinate units in the operation order format. A water movement table, route overlay or strip map, and watercraft loading tables are included in the water movement order. Appendix E contains examples of the tables; figure 4–4 is an example of a route overlay. The water movement order may be an annex to the operation order with detailed instructions in appendixes to the water movement annex.

(4) The water movement table lists assignments of units to serials or movement units within the water movement columns. The location of units in successive serials or movement units complies with landing priorities. Ideally, all elements of a given serial or movement unit land in the same landing area, using several landing sites. However, operational requirements may necessitate a release point (RP) en route to the landing area. Control passes to elements of the serial or movement unit at this point. The elements then proceed to the designated landing area or landing site and land in the order specified in the landing plan; or they go to the planned area of employment to conduct fire support, blocking, or other missions to support the operation. Tactical integrity for Army and Navy units is maintained as far as practicable.

(5) Security of the units involved in the movement is a primary consideration during planning. Threats to waterborne units include water mines, water obstacles, ambush, harassment by snipers and indirect fire, and direct involvement in a meeting engagement. Armed helicopters escort all water movements and provide reconnaissance, fire support, and communication relays. Close air support is available, as required. When possible, waterborne movements are preceded by minesweepers and reconnaissance and security elements using all available means of transport. Troops are briefed thoroughly on security plans, with emphasis on counterambush and SOP security measures.

(6) Organic and attached reconnaissance elements use both Navy watercraft and Army assault boats for water route reconnaissance. The size of the movement unit, the length of the formation, the speed of advance, the terrain, and the suspected disposition of enemy forces along the routes determine the area on each side of the waterway that is reconnoitered. Commanders consider attaching engineer elements to the reconnaissance units to assist in the destruction of obstacles and fortified positions. Army assault boats are used only when the threat is insignificant.

(7) Planners consider formations that contribute to movement control and mutual support while retaining unit integrity as much as possible. Figure 4–5 shows a typical water movement formation. Units conducting water movements normally have four primary components: an advance guard, a flank guard, a rear guard, and a main body. Formations are similar to those used in ground movements to contact. The functions of the security elements and the distances within the formation are outlined in FM 7–11 and FM 7–20. These formations facilitate Navy control of watercraft movements while maintaining unit integrity.

(*a*) *Advance guard.* This component, operating ahead of the main body, uses naval watercraft and/or assault boats to prevent unnecessary delay in the movement of the main body and to protect it from surprise frontal attack. It covers the deployment of the main body if necessary. The advance guard is far enough in front of the main body to allow the succeeding element to deploy without serious interference from the enemy, but not so far as to prevent the succeeding element from rapidly assisting the advance guard, when required. This distance is approximately 400 meters. The battalion reconnaissance platoon may be used as the advance guard.

(*b*) *Flank guard.* In the approach march, flank guards operate in the area from a point opposite the rear of the advance guard to a point opposite the front of the rear guard to protect the main body. Naval watercraft serve as a close-in flank guard. Elements from

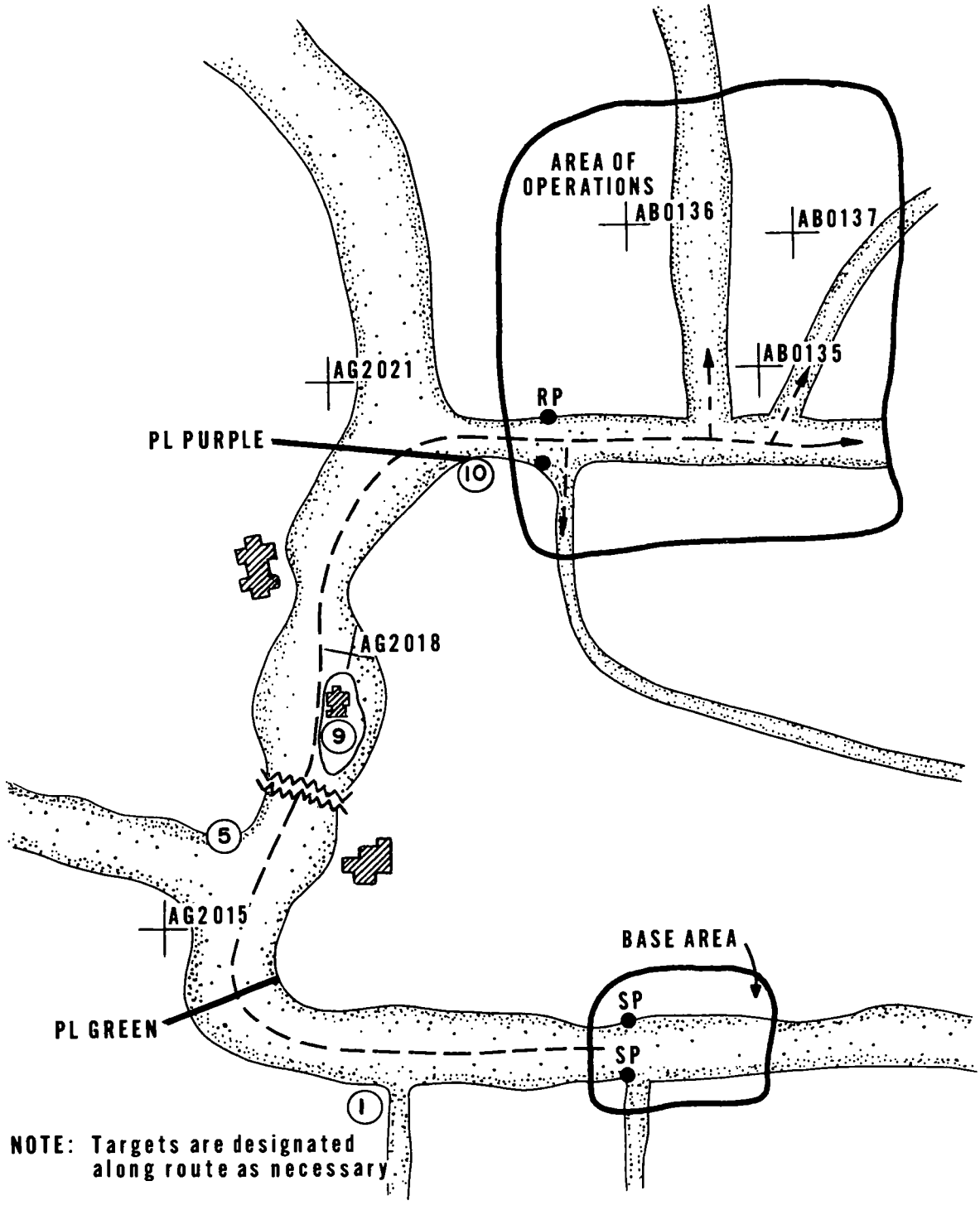


Figure 4–4. Water movement diagram.

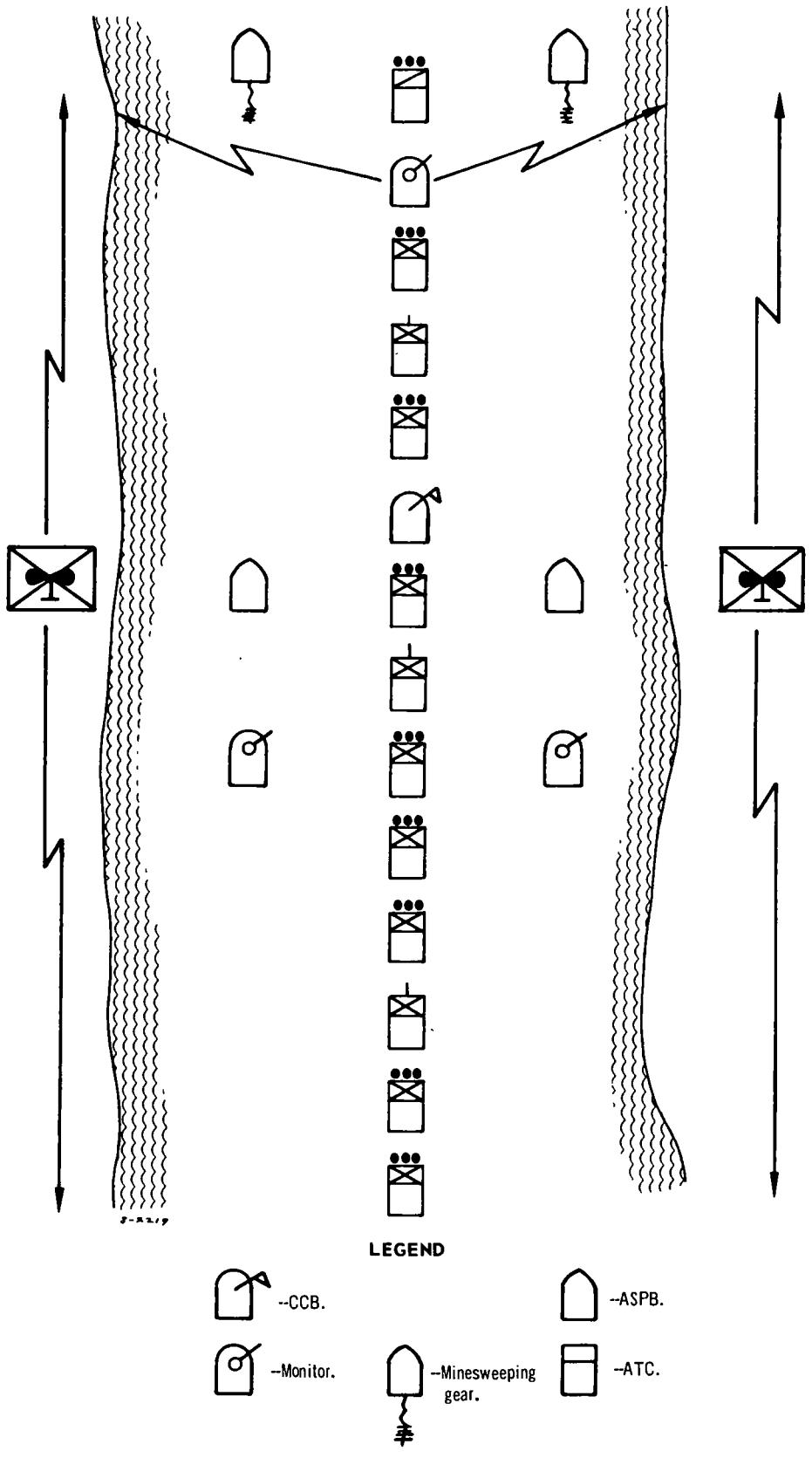


Figure 4–5. Typical battalion waterborne movement formation.

the main body may be required to provide a flank guard operating on land adjacent to the water movement route. Naval watercraft and Army assault boats can transport the flank guard operating ashore from one blocking position to the next to maintain the flank guard's position alongside the main body.

(*c*) *Rear guard.* The rear guard follows and protects the main body from enemy attack from the rear. The rear guard normally consists of naval patrol-type boats and may or may not have ground troops embarked. The rear guard is organized similar to the advance guard except that it is oriented to the rear and may include a trail party. The rear guard also controls any friendly water traffic that overtakes the movement column.

(*d*) *Main body.* The bulk of the battalion and supporting forces comprise the main body. This element is organized for combat before the water movement begins. Units are positioned for rapid deployment if the enemy attacks during the movement. Watercraft in the formation must assist rapid employment of assault troops in any direction without excessive risk of collision.

(8) Both Army and Navy forces develop plans for coordinated, immediate reactions to enemy ambush encountered during water movement. Plans include designation of counterambush maneuver elements, command and control measures, fire support, all-round security, identification and recognition of committed elements, and recovery and reorganization of the committed force. Provisions are included for watercraft security and reserves when major elements of the ground force have been committed to counterambush missions. The waterborne force's mission determines the reaction to an enemy ambush. Actions may range from commitment of the entire waterborne force to attack and destroy enemy forces encountered to taking evasive action and suppressing the ambush by fire and continuing the movement.

g. Loading Plan.

(1) The water movement plan is the basis for the loading plan. At battalion and lower levels, they are integrated into one plan. The loading plan for a waterborne operation is normally less complex and detailed than for airborne, airmobile, or amphibious operations. Some battalion loading plans may be complex enough to require written instructions for delivering troops and equipment to the loading area; designating loading sites, loading times, and priorities; and specifying personnel, supplies, and equipment to be loaded aboard each watercraft. Unit SOP simplify loading plans and reduce loading time and written orders to a minimum.

(2) Details of the loading plan are coordinated with the supporting Navy RAS through liaison personnel and/or joint staff planning. The watercraft loading table (app E) specifies personnel, equipment, and supplies to be loaded in each watercraft. This table is normally published as an appendix to the water movement plan.

(3) A loading area diagram may be issued as part of the water movement plan to insure a coordinated effort and to avoid confusion in loading during large operations. Figure 4–6, an example of a typical loading area diagram, shows a combination of loading from a land base and an afloat base.

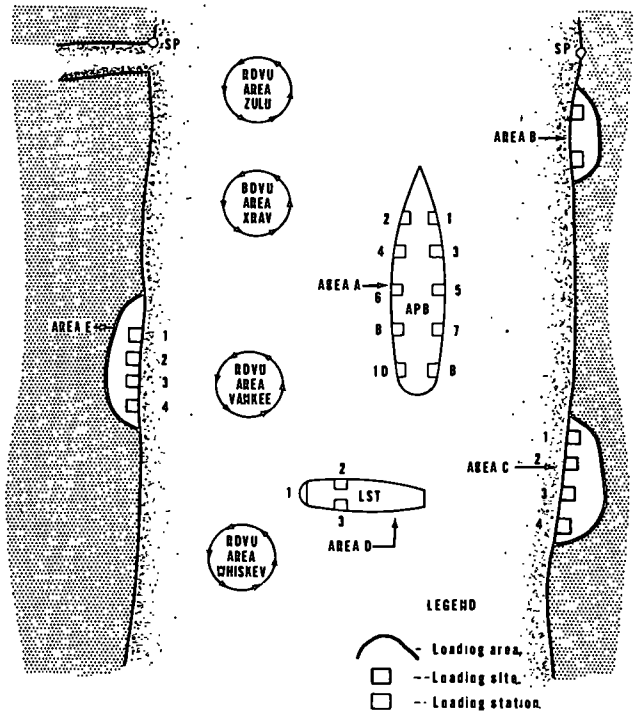


Figure 4–6. Typical loading area.

(4) In preparing loading plans, the following items are considered:

(*a*) *Mission.* The loading plan supports

the mission, which determines the troops, equipment, and supplies to be moved.

(*b*) *Watercraft.* Personnel preparing loading plans are familiar with the types and characteristics (app B) of the watercraft available. Cargo-carrying characteristics listed below are considered:

1. Allowable cargo load.

2. Size and shape of the cargo compartment and its limiting features.

3. Strength of deck (flooring).

4. Location and strength of cargo tiedown fittings.

5. Location, number, and type of troop seats or troop space available.

6. Capacity to carry assault boats externally.

7. Capability to tow assault boats and other watercraft.

8. Organic loading aids available (ramps, winches, and hoists).

(*c*) *Unit integrity.* Unit integrity is maintained if possible.

(*d*) *Distribution.* Key personnel are distributed throughout the main body so that the loss of one boat does not destroy the unit's command structure. Key items of equipment, such as crew-served weapons and communications equipment, are also distributed throughout the movement formation. Medical personnel are also distributed throughout the main body. The boat that transports the battalion surgeon is the battalion aid station for the movement. When possible, this craft serves as the battalion aid station in the AO. It is normally attached to the movement unit containing the forces to secure the combat base on reaching the AO.

(*e*) *Self-sufficiency.* Personnel and ammunition are loaded in the same watercraft with their crew-served weapons, and component parts are loaded with major items of equipment. Personnel to unload the cargo at the destination accompany each watercraft.

(*f*) *Weights.* Standard weights for individuals plus their combat equipment and their share of hand-carried table of organization and equipment (TOE) equipment are used in computing watercraft loads:

1. Watercraft crewman—200 pounds.

2. Combat equipped soldier—240 pounds.

3. Litter patient—190 pounds.

(5) The senior Army member aboard each watercraft prepares a manifest, which is an informal listing of the Army personnel and equipment loaded on that craft. Copies of the completed manifest for each craft are delivered to the Army unit commander who uses them as an aid in prompt determination of any losses that may occur.

(6) Spare watercraft are available in the loading area, if possible, in case one or more watercraft abort.

4–14. Conduct of Waterborne Operations

a. Preparation.

(1) Units are trained and prepared to conduct waterborne operations on short notice. SOP are kept current by applying lessons learned in previous waterborne operations. Training and adequate unit SOP allow marshaling activities to focus on the pending tactical operation.

(2) Units complete preparations for the tactical operation, move to their loading area, and load on assigned watercraft in accordance with the water movement table and information in the watercraft loading table. Bulk supplies and ammunition are transported to the loading site and loaded and lashed in designated watercraft.

(3) Since several units may use the same loading site, loading must be completed and watercraft moved to their assigned rendezvous area according to the time schedule in the water movement table.

b. Water Movement.

(1) *General.* All water movements outside base areas are tactical moves. They are similar to the approach march of a movement to contact in ground operations where speed of movement and security of the formation are essential. The intent of the operation is to move directly to the objective; however, the unit is prepared for combat at any point along the movement route. The terrain and the enemy situation normally require an advance guard, flank guards, and a rear guard to portect the main body during movement. Enemy forces have an infiltration and ambush capability and have developed techniques to exploit watermobility. They have a movement and a limited combat capability when water-

borne. During movement, the primary threat is normally an ambush on the flanks rather than to the front, and the enemy may strike at any point in the column. Units are organized for a rapid assault landing to either flank, followed by subsequent landings to close with and destroy the ambush force.

(2) *Organization.* The organization for the approach march (described in FM 7–20) applies generally to waterborne movements. There are organizational differences because watercraft are used as a means of transportation. Counterambush plans may be to suppress the ambush by fire and continue movement or assault and destroy the ambush force. The action taken to counter the ambush depends on the mission, the size of the ambush, the ability of security forces to suppress the ambush force and protect the main body, and the characteristics of the waterway. The formation adopted normally consists of an advance guard, a flank guard, a rear guard with a trail party, and a main body.

(*a*) *Advance guard.* The advance guard of a waterborne movement normally includes a mine countermeasure element, a reconnaissance element, and a fire support element. Figure 4–7 is an example of advance guard formation. The tactics employed and formation used by a waterborne reconnaissance element are described in appendix C.

1. The mine countermeasures element consists of naval watercraft with minesweeping equipment. This element adopts a formation based on the type of equipment used. This group moves in advance of the advance guard to clear the waterway of mines. Engineer personnel may be attached to the element to assist naval personnel in clearing mines.

2. The reconnaissance element consists of troops operating in ATC to locate enemy elements in the vicinity of the waterway banks. The area reconnoitered depends on the speed of the main body, the terrain, and enemy activity. Reconnaissance elements may be augmented with engineer personnel to destroy enemy fortifications encountered. Reconnaissance elements maintain constant vigilance for wires that may lead to command-detonated watermines. When the reconnaissance element

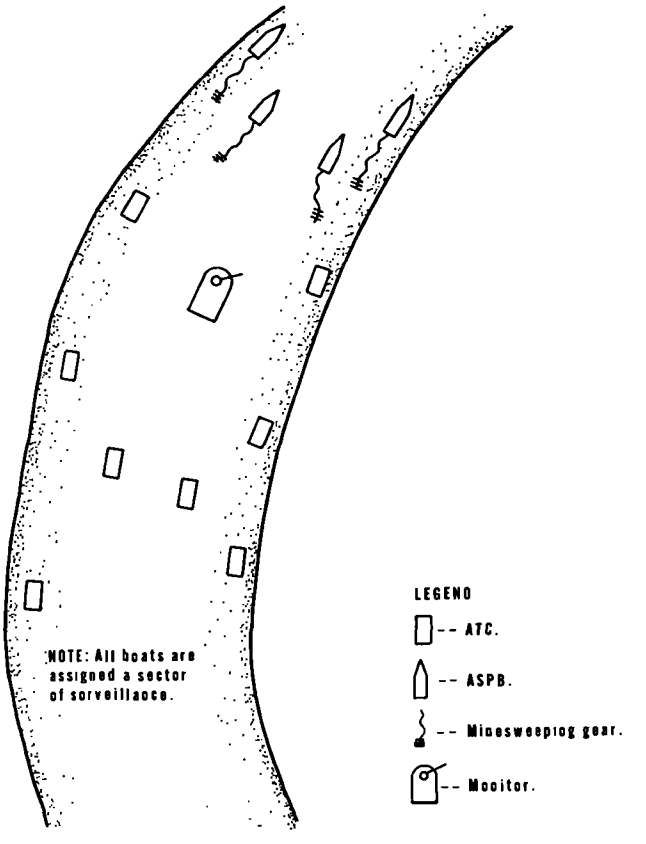


Figure 4–7. Typical advance guard formation.

uses assault boats, the boat procedures described in appendix C are followed.

3. The support element is composed of naval watercraft, which move with the reconnaissance elements and provide support as required. The commander of the reconnaissance element may ride in one of the support boats to use the boat's communications facilities for control and to direct the fire support provided to reconnaissance elements engaging enemy forces.

(*b*) *Flank guard.* RAS craft provide a close-in flank guard and are normally assigned to a zone during movement. The zone may be on a flank, between serials of movement units, within serials or movements units, or a combination of these positions. The formation of the main body and other factors, such as hydrographic conditions, are used to determine locations for flank guards. When the column is attacked, aggressive action by the close-in flank guard provides the commander time and space for maneuver of the main body. Air cavalry or airmobile units are used

to extend reconnaissance and surveillance beyond the shores of the waterway.

(*c*) *Rear guard.* RAS craft normally provide a rear guard during movement. While a rear guard may not be necessary during movement, when forward movement halts, the waterborne force is vulnerable from the rear and requires the deployment of a rear guard for security. Surveillance of the waterway traversed is important to preclude the enemy from placing watermines behind the waterborne force. The enemy attempts to detonate these mines when the waterborne force returns from the operation.

(*d*) *Main body.* The main body comprises the bulk of the waterborne force and consists of maneuver elements and the naval command and control elements. It is organized for combat prior to movement. The serials or movement units within the main body are organized for employment singly or in a coordinated action. The entire waterborne force is oriented toward counterattack to the flanks, rather than to the front. Each movement unit provides a reserve and far-bank security during counterattack actions.

(*e*) *Trail party.*

1. Although a trail party is not normally designated in a battalion-size water movement, trail party functions to include towing, damage control/salvage, medical aid, and providing available spare transport craft, are required. Spare transport craft are attached to the rear movement unit and are prepared to tow disabled craft and to perform minor damage control and salvage.

2. Designated craft within the movement units tow disabled craft clear of the formation, and elements of the last movement unit or the trail party take these vehicles in tow. Other assistance, such as firefighting, may also be required, and embarked troops may have to assist boat crews in immediate action. Appendix C describes these required actions. If an RAS can repair breakdowns or combat damage, disabled craft will be repaired while being towed. When possible, relatively secure areas along the water movement route are used to berth more seriously disabled craft, pending retrieval or repair by river support squadron units.

(3) *Formations.* Enemy information, width of the channel, availability of transport craft, availability of fire support craft, and control measures required influence the selection of a formation for the waterborne movement. The main body is divided into serials or movement units that can be effectively controlled. Formations are developed on the basis of planned reaction to enemy attach with emphasis on maintaining unit or element tactical integrity.

(*a*) *Formation used when there is a significant enemy threat.* This formation (fig. 4–8) is used when contact is probable and when enemy control of terrain adjacent to the waterway makes it preferable. Lateral dispersion and maneuver are limited in narrow channels. This formation permits rapid employment of ground forces toward the flanks when required and permits massing of fire when an ambush is suppressed and movement continues. Naval fire support craft of the flank and rear guard position themselves to support the assault landing of maneuver elements instead of interposing themselves between the enemy force and the ATC's.

(*b*) *Column formation.* This formation is used when friendly forces control the terrain adjacent to the waterway, when the enemy situation is not clear, or when control of watercraft during the movement is a major consideration. It provides maximum control and prevents a major portion of the unit from becoming involved in a single ambush. It also provides maximum use of naval firepower and allows sufficient time and space for the main body to maneuver. Figure 4–9 shows a typical column formation.

(4) *Control.* Control procedures for the water movement are similar to those for other movements.

(*a*) *Rendezvous area.* Control of the movement begins in the rendezvous area where the serials or movement units form for the water movement.

(*b*) *Start point.* Movement units preceed from their rendezvous area in formation to cross the start point (SP) at the scheduled time. The security units (advance, flank, and rear guards) are assigned SP times and rendezvous areas, as necessary, to form them properly in relation to the main body.

(*c*) *Checkpoints.* Checkpoints are used as in other movements.

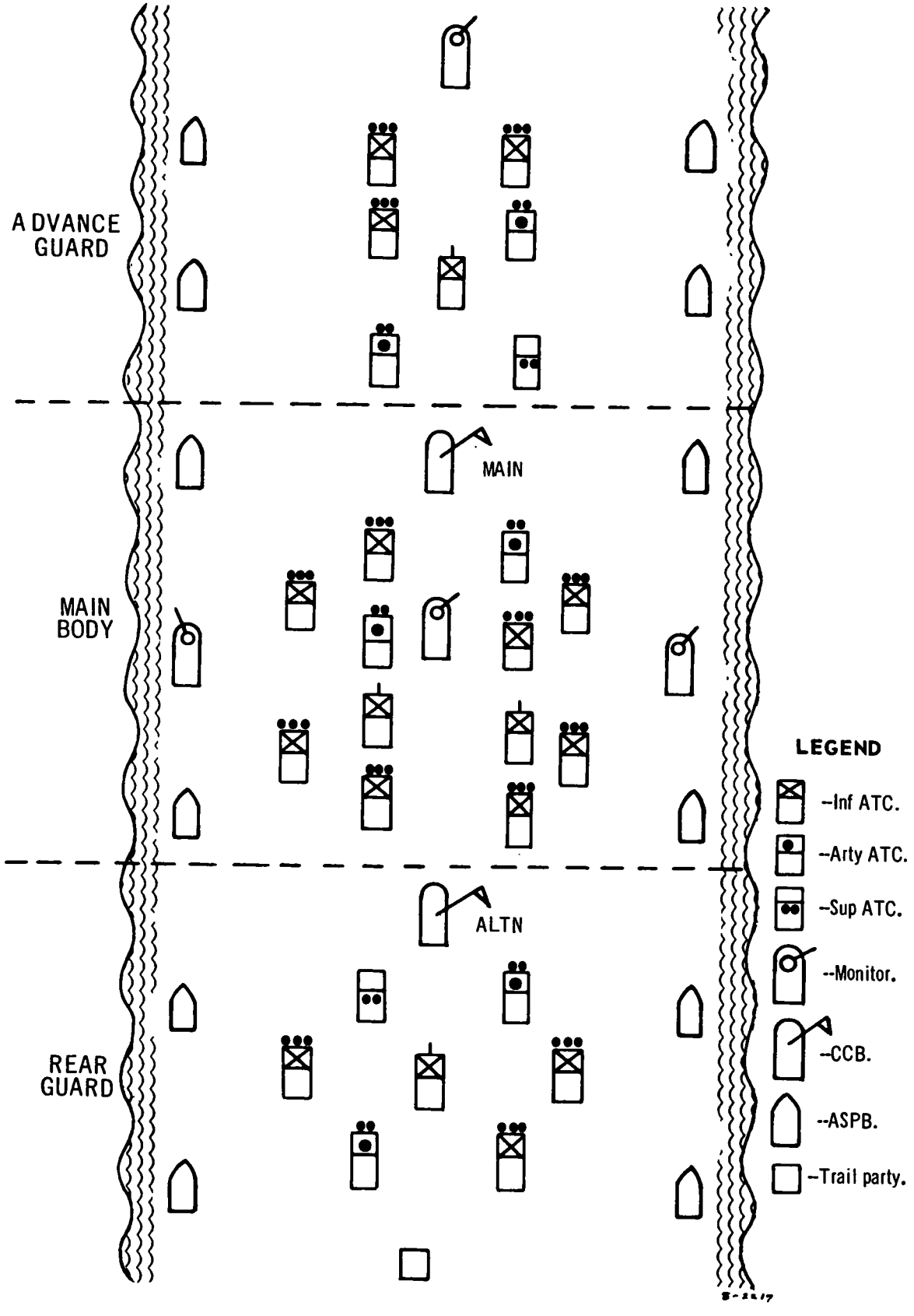


Figure 4–8. Typical movement formation when the enemy threat is significant.

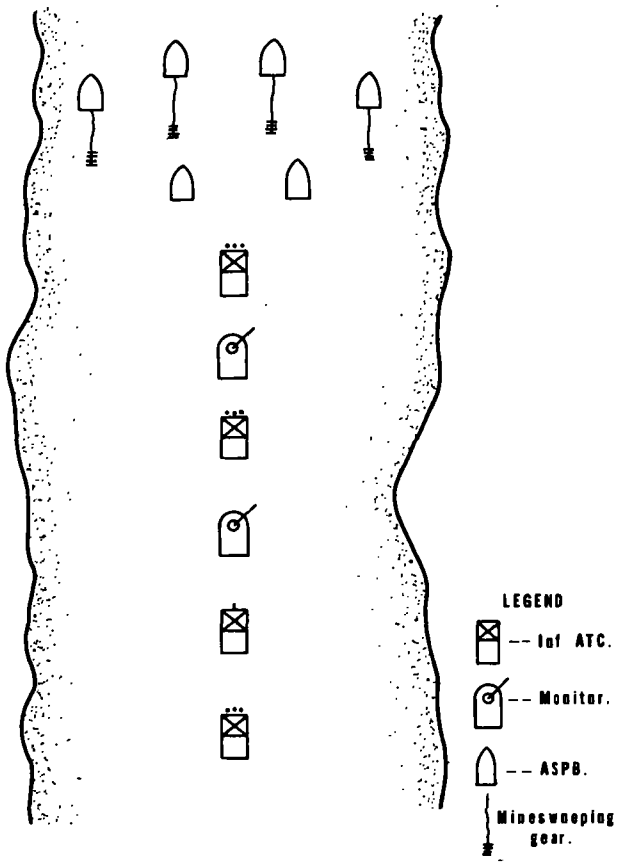


Figure 4–9. Typical column formation.

(*d*) *Release point.* The release point (RP) is that point on the water movement route where movement units are released to subordinate commanders to proceed to designated assault landing areas. Each movement unit normally is in its assault landing formation before the lead craft passes the RP.

(*e*) Traffic control. Civilian boats are inspected and cleared from the waterway, if possible, and beached; gathered at control points; or routed clear of the formation. The advance, flank, and rear guards of the waterborne force normally perform traffic control functions. In congested areas, additional traffic control elements are necessary.

(*f*) *Fire control.* The flat terrain and sinuous waterways often found in a riverine environment require planning and coordinating fire control measures to prevent firing into friendly elements. The waterborne force uses a jointly prepared fire control plan that provides for both full use of RAS firepower and protection for friendly elements. The plan is simple and normally includes—

1. Zones of responsibility for weapons or craft.

2. Assignments of target priority to gun stations.

3. Suppressive fire plan.

4. Assault landing support plan.

5. Employment of troop weapons from well deck.

6. Communication procedures.

(*g*) *Others.* Naval SOP provide additional control measures for watercraft that consist of, but are not limited to—

1. Standard formations.

2. Maneuvering instructions.

3. Standard speeds and turns.

4. Standard distance and interval between boats.

5. Signal procedures—visual and electronic.

(5) *Immediate action.* Immediate action procedures are used to overcome conditions or situations that adversely influence individual watercraft, movement units, or the entire waterborne force. Typical immediate-action procedures are—

(*a*) Employing counterambush suppressive fires.

(*b*) Initiating counterambush assault landings.

(*c*) Establishing local security for a damaged boat that must be beached.

(*d*) Employing troop weapons.

(*e*) Embarked troops manning boat-mounted weapons when boat crews are engaged in damage control or when assigned gunners become casualties.

(*f*) Firefighting.

(*g*) Passing tow lines, using boat crew and embarked troops.

(*h*) Abandoning ship.

(6) *Combat support.* Available combat support elements support all water movements. The following means of combat support are required to support all operations in an AO:

(*a*) *Artillery.* Planned artillery fires along the movement route and harassing and interdiction (H&I) fires into suspect areas assist in protecting the waterborne force during movement. These fires are used against suspected ambush sites and mined locations. Naval gunfire, when available, is used the same way. Preplanned Concentration and H&I fires

are coordinated with host country officials through the sector operations and intelligence coordination center (SOICC) or combat support coordination center (CSCC) to preclude injury or damage to civilian personnel and property.

(*b*) *Air reconnaissance.* Air reconnaissance improves the all-round security of the waterborne movement. It often detects mines, mine control personnel, ambush sites, mortar emplacements, assembled troops, etc., that ground reconnaissance elements may not find. Air reconnaissance of specific areas may preclude employing ground elements in these areas. The habitual employment of air reconnaissance elements to the front and flanks of the main body and over the route immediately ahead provides added protection to the waterborne force.

(*c*) *Close air support.* Close air support provides rapid and accurate delivery of ordnance on an enemy force that may be in defilade from the waterborne force because of high banks, dense tree lines, or fortifications.

c. Assault Landing.

(1) Landing areas normally are selected to avoid known defended positions. Assault landing formations are selected and supporting fires are planned, either as preparatory fires or on-call fires, if the enemy defends the landing sites. Assault landing formations provide for rapid, orderly movement of units ashore and an immediate advance to secure initial objectives close to the landing sites. RAS craft are stationed to provide fires to the flanks and rear, as well as to the front of the maneuver elements. The success of the landing depends, to a degree, on positive control that coordinates and directs the movement of boats and ground units.

(2) The landing and the reorganization in preparation for the scheme of maneuver are critical periods for the maneuver elements. These operations require speed and precision in execution.

(3) Water movement serials or movement units are organized to facilitate the immediate securing of initial objectives, reorganization, and implementation of the scheme of maneuver. Units land as close as possible to their initial objectives. Normally, securing initial objectives and reorganizing take a short time. Security elements move directly to assigned positions to secure the landing areas.

(4) The battalion reorganizes according to plan, using designated initial objectives as assembly areas.

(*a*) Mortar, artillery, and other fire support units occupy their initial firing positions and support the reorganization and prepare to support the scheme of maneuver.

(*b*) Subordinate unit commanders report status of personnel and equipment after securing their initial objective. Reorganization is complete when all or the majority of subordinate units have secured their initial objectives (assembly areas) and battalion control has been established.

(5) On completion of the landing and the reorganization, the battalion normally establishes a combat base near the landing area. The combat base includes RAS elements and both land and navigable water areas. The combat base remains mobile during fast-moving tactical operations to control and support engaged maneuver elements.

(6) Security is required for watercraft after troops debark. The preferred method of providing security for the boats is to rendezvous them in relatively safe areas (holding areas) rather than to divert combat troops as security elements for them. Monitors and ASPB's may assist ATC crews in establishing adequate security. Monitors, ASPB's, and ATC's are capable of providing fire support for advancing ground troops or serving as blocking elements on waterways.

d. Movement to Contact (Scheme of Maneuver). The movement to contact is initiated when the commander is satisfied that the assault landing, reorganization, and securing of initial objectives have progressed to the desired degree. Movement to contact follows procedures described in the FM 7- and 17-series as modified by this manual and FM 31–16. Naval watercraft and Army assault boats support these operations by making maximum use of available waterways.

(1) Units designated as a waterborne reaction force maintain a maximum readiness posture. Personnel of these units are restricted to designated areas and issued individual supplies and equipment. Unit supplies, equipment, and ammunition are loaded or prepared for immediate loading aboard assigned water-

craft. Loading tables and manifests are prepared and kept current to insure a prompt, coordinated departure on receipt of orders.

(2) Conducting a movement to contact on foot reduces the attacking force's maneuver capability to that of the enemy. The enemy normally withdraws as rapidly as the attacking force advances. Encirclement, surprise, and firepower, as described earlier, are used to fix the enemy and prevent his withdrawal.

(3) Attacking units move along waterways when possible. Trails and footpaths normally parallel waterways, making foot movement faster and less exhausting than it is farther inland. The enemy normally organizes defensive positions along the long axis of waterways and plans observation and grazing fire to cover the open fields. Attacking along the waterway, maneuver elements take advantage of concealment provided by vegetation and can attack the enemy's flank, restricting his observation and fire. Movement along waterways is not always possible and cross-country foot movement may be required. When waterways cross the route of movement, they present significant obstacles to foot movement. Crossing canals and ditches with soft mud bottoms consumes time and strength. Many canals can be crossed without assistance, and units continue to advance unless the width or depth of the waterway stops them.

(4) In riverine areas, cross-country movement is often along the top of narrow earthen dikes. Units disperse and move on parallel dikes to advance on a wide front. Troops should not bunch up where dikes converge or intersect. Movement of troops along dikes is evaluated in relation to the enemy threat. The enemy often positions automatic weapons to place grazing fire along the dikes.

(5) When the enemy has been located and fixed, indirect fire and close air support are used to assist in the destruction of the defense position, suppression of enemy fire, and annihilation of the enemy. Once the enemy position has been overrun, it must be thoroughly searched for weapons and equipment that the enemy may attempt to recover later.

(6) In all instances in which troops move cross-country, security is a critical factor. Personnel are required to maintain dispersion. However, in many areas, security elements close up to within 2 to 5 meters of one another to detect the enemy's hiding places. Security elements move well forward of the main body and to the flanks and rear. When approaching a tree line, the security elements move into the tree line and clear it before the main body approaches. When security elements receive fire, a vigorous assault coordinated with indirect fire and airstrikes is used to neutralize or destroy enemy positions.

(7) During movement, troops remain alert to detect mines, obstacles, and boobytraps. Punji stakes, demolitions, and other devices may be hidden below the waterline in streams and canals. Tripwires for mines and boobytraps may be strung across a trail, canal bank, or footbridge. When security conditions permit, personnel remain 10 to 15 meters apart to limit casualties if a mine or boobytrap is detonated. All footbridges are thoroughly examined before anyone crosses them. They may collapse under the weight of a combat loaded soldier, and the water beneath them may hide boobytraps or punji stakes. After clearing a footbridge for use, personnel cross one at a time.

(8) Methods of crossing inland waterways.

(*a*) Each squad carries a minimum of one 50-foot length of ¼-inch rope and one air mattress as aids in crossing unfordable to protect personnel at the crossing site before troops begin the crossing. When the security element is in position, one soldier swims waterways. Security elements are positioned across the waterway taking one end of the rope with him. He ties it to a stationary object, providing an anchor line across the waterway to help others cross. Weapons and other equipment may be towed across the water on the air mattress. A security element is established on the far bank as soon as sufficient personnel are available. Multiple crossing sites are used to reduce crossing time for a unit larger than a squad.

(*b*) The canal bridge for troops is a flat, buoyant sheet of fabric over plastic foam, which offers troops a rapid means of transit across narrow bodies of water. It allows troops to avoid established footpaths and bridges and to cross streams and canals at multiple points.

The bridge is provided in 4- by 15-foot sections and weighs approximately 2 pounds per running foot. As personnel walk across the bridge's surface, the surface is deformed and sinks slightly. Fabric side flanges keep the water off the center section of the bridge. When there is no load on it, the buoyant bridge lies flat on the surface of the water.

(*c*) The grapnel with line (propelled) is a 4.5-pound folding grapnel assembly, propelled from an M79 or an XM148 grenade launcher, pulling a 400-foot-long, 0.312-inch line. It is used to aid troops in crossing fast-moving streams, ravines, canyons, cliffs, and similar obstacles. When the grapnel is firmly engaged, the line will support the weight of a 300-pound man and enable him to cross or ascend 150-foot obstacles.

(*d*) The flotation gear for the individual soldier is lightweight, reusable flotation gear that will support a combat-loaded soldier during water crossings. It consists of three bladders inclosed in a one-piece cover. When the bladders are inflated, the cover forms a U that fits around the soldier's body. When deflated, the packaged unit is 6 inches long, 4 inches wide, and 2 inches thick and weighs only 8 ounces. It can be used with or without a full pack.

(*e*) The four-man lightweight fabric boat is a low-silhouette boat that can be used for crossing rivers or canals and for scouting and clandestine operations on inland waterways. The boat weighs less than 6 pounds and will carry four men with combat equipment. The boat is made of multiple breath-inflated bladders inclosed in a nylon cover. The multiple bladders keep the craft afloat even when some sections are punctured. The boat measures 15 by 10 by 6 inches deflated and 108 by 38 by 10 inches inflated.

(9) Mechanized infantry units, using organic APC's, can traverse a riverine area with considerable freedom of actions. Seasonal aspects decidedly influence operations, particularly those concerning off-road trafficability and cross-country movement in a riverine area. As in conventional operations, routes are carefully selected. The significant problem affecting mechanized movement is not the water obstacles, but the techniques for crossing and exiting canals. Development of a trafficability map indicating those waterways where difficulty is anticipated or expected becomes paramount. The APC provides a means of rapid movement while retaining unit integrity. Movement may commence from a land base or an existing AO, or it may follow initial transport into an AO by Navy watercraft. Field manuals of the 7- and 17-series and FM 31–16 provide information on mechanized combat operations.

(*a*) Waterborne operations.

1. Areas accessible by road or cross-country movement during the dry season are sometimes inaccessible during the rainy season. Army or Navy craft such as the LCM (6), LCM (8), LCU, or LST can transport APC's on waterways. Reconnaissance to locate potential landing sites is the key to the successful water movement and debarking of APC's in the AO. The amphibious characteristic of the APC permits it to be off-loaded in locations where the shallow bottom prevents the watercraft from reaching shore. Planners study tide tables and other hydrographic information to prevent debarking APC's on mudflats or near banks too steep for APC's to climb.

2. Mechanized units may reach an AO by watercraft and withdraw overland, mounted in APC's. Withdrawal or extraction is often a critical phase of an offensive operation. During this phase, enemy opportunities for ambush are greater because troops are fatigued and consequently less alert. As in any movement, air observation is essential to assist in detecting an ambush force.

(*b*) Mechanized units in a riverine environment are not normally employed independently, but operate in coordination with waterborne and/or heliborne units. In addition to the normal missions described in current field manuals, mechanized units can perform the following specialized missions:

1. Counterambush. Immediate, positive, and aggressive action is required. Chapter 5 provides information on counterambush procedures.

2. Blocking. Mechanized elements normally conduct blocking actions while the assault elements maneuver using other means of transportation. Because a mechanized unit

can move rapidly, it can block, or cut off, the enemy's escape route.

3. LOC security. The unit performs an LOC security mission similar to a route security mission. The LOC may be either a waterway or a land route.

4. Security for resupply missions. The unit operates in coordination with other units to provide security for watercraft resupply missions after troops have debarked in the AO. Chapter 5 provides information on techniques employed to avoid ambushes and conduct counterambush operations.

5. Interdiction of enemy supply routes. Patrols, raids, or other offensive operations, separately or in conjunction with other units, are used to interdict routes that the enemy uses for resupply. The supply routes may be on land or water or both.

(*c*) Mechanized units crossing canals and paddies.

1. Numerous irrigation canals varying in width from 3 to 5 meters present the primary obstacles to APC trafficability. Canals with steep mudbanks present a difficult barrier to APC movement. The initial reconnaissance and selection of crossing sites frequently determine the method to use in crossing. A major consideration at the exit point is the trafficability of the bank because sufficient traction is necessary for the vehicle to pull itself from the canal. Frequently, the only adequate exit point is upstream or downstream from the entrance point. Consideration of the influence of the tide is required in the initial planning stage. A heavy accumulation of mud in canal bottoms may make an otherwise easy crossing extremely difficult at low tides. Appendix D provides information on canal crossing techniques and illustrates them.

2. The marginal terrain assault bridge mounted on and launched from an APC is particularly useful for crossing canals and steep-sided irrigation and drainage ditches. The bridge can support 15-ton loads over spans up to 10 meters. The bridge launcher operates hydraulically, and the hinged aluminum bridge can be emplaced in less than 2 minutes from its mounting on the APC. The bridge can be retrieved in 10 minutes by reversing the launching procedure.

3. Trafficability and cross-country movement for APC's may be better during the rainy season than during the dry season. Rice paddies with from 0.5 to 1.5 meters of water are completely trafficable for the APC. For example, most of the Plain of Reeds area in South Vietnam is trafficable to mechanized vehicles. Uncultivated ground usually poses problems in off-road mobility. Swamps, marshes, and daily tidal variations, as well as speed of the current, have a detrimental effect on cross-country mobility.

4. The M696 Recovery Vehicle is an M548 Cargo Carrier modified by the addition of a 5-ton crane. The cross-country trafficability, fording capability, and flotation of this vehicle are comparable to that of the M113. Other tracked recovery vehicles are generally not suitable for cross-country movement in a riverine area. FM 20–22 provides expedient recovery techniques.

e. Waterborne Withdrawal.

(1) A waterborne withdrawal is similar to a waterborne movement to contact. The treat of attack is much greater because the enemy usually has information on location, composition, and relative combat power of the waterborne force. During the withdrawal, reconnaissance by fire, use of planned fire support on suspect areas, and alertness of all personnel are used to counter enemy threats. The loading and rendezvous phases of the waterborne withdrawal are critical.

(2) On arrival in the loading assembly area, units complete preparations for loading and form into boat-load groups. These groups move to the loading site when summoned by loading control personnel. Unit integrity is not sacrificed for speed of loading or for maximum use of the watercraft capacity unless absolutely necessary.

(3) The arrival of units at loading areas is coordinated with the arrival of watercraft. Watercraft remaining in the loading area longer than necessary invite destruction by enemy fires.

(4) When loaded, individual watercraft proceed to designated rendezvous areas in a secure stretch of the waterway. Unit rendezvous areas are dispersed within the waterborne force assembly area. When all water movement units are in the rendezvous area and the detachments left in contact are

loaded, the units proceed toward the SP and take up assigned positions within the formation. The water movement during the withdrawal is conducted as described in *b* above.

(5) Loading areas for the detachments left in contact are as close as practicable to their battle positions. Helicopters are preferable for this phase of the withdrawal because they can land, load, and take off faster.

(6) Maximum use is made of RAS fire in support of withdrawing units, particularly if the situation requires executing simultaneous withdrawal of all elements without employing detachments left in contact.

4–15. Employment of Organic Combat Support Elements

a. Reconnaissance Platoon.

(1) This platoon can perform waterborne reconnaissance and provide limited security for the waterborne battalion. It normally is employed as a unit under battalion control because of the complementary nature of the platoon elements. Under certain conditions, however, the platoon, or elements of it, may be attached to another unit or task force organized for a specific operation. The platoon also may operate as an independent element to perform special missions.

(2) The platoon can conduct water route reconnaissance using assault watercraft as its primary transportation. Platoon elements may debark long enough to conduct spot reconnaissance of land areas along the waterway banks. Platoon elements may be leapfrogged along the route by watercraft to maintain a speed of movement equal to that of the main body.

(3) In performing a water route reconnaissance mission, the platoon may require support from other units, such as engineers, Army aviation, artillery, and RAS. Elements of the battalion ground surveillance section also may be attached to the platoon.

(4) During water route reconnaissance missions, boats of the RAS (monitor or ASPB) may be attached to, or support, the platoon to provide a command and control facility for the platoon leader, communication relay, and fire support.

b. Heavy Mortar Platoon.

(1) FM 7–20 contains information on planning and coordination procedures.

(2) Watercraft, barges, armored self-propelled mortar carriers, or helicopters provide transportation for heavy mortars in riverine operations. Even though the heavy mortar platoon mounted on barges is readily transportable throughout a riverine area, the probable requirement to provide security for a base area may dictate splitting the heavy mortar platoon. This fragmenting enables the platoon to provide fire support for both maneuver elements and base areas.

(3) The platoon provides fire support to maneuver elements during the assault landing and the securing of initial objectives. When waterways permit, watercraft will displace the platoon and resupply ammunition. Ammunition is kept on the barge and on supporting watercraft.

(4) Chapter 6 contains additional details on employment of the platoon.

c. Antitank Platoon.

(1) The antitank platoon is normally employed in the defense of the base areas.

(2) The composition of enemy units and the riverine environment preclude the platoon's engaging tanks. The platoon's normal secondary mission of engaging other point targets becomes its primary mission in riverine operations. When in the AO, the platoon engages enemy bunkers, watercraft or vehicles, crew-served weapons, and similar targets. The use of antipersonnel ammunition is particularly effective against human-wave attacks.

d. Ground Surveillance Section.

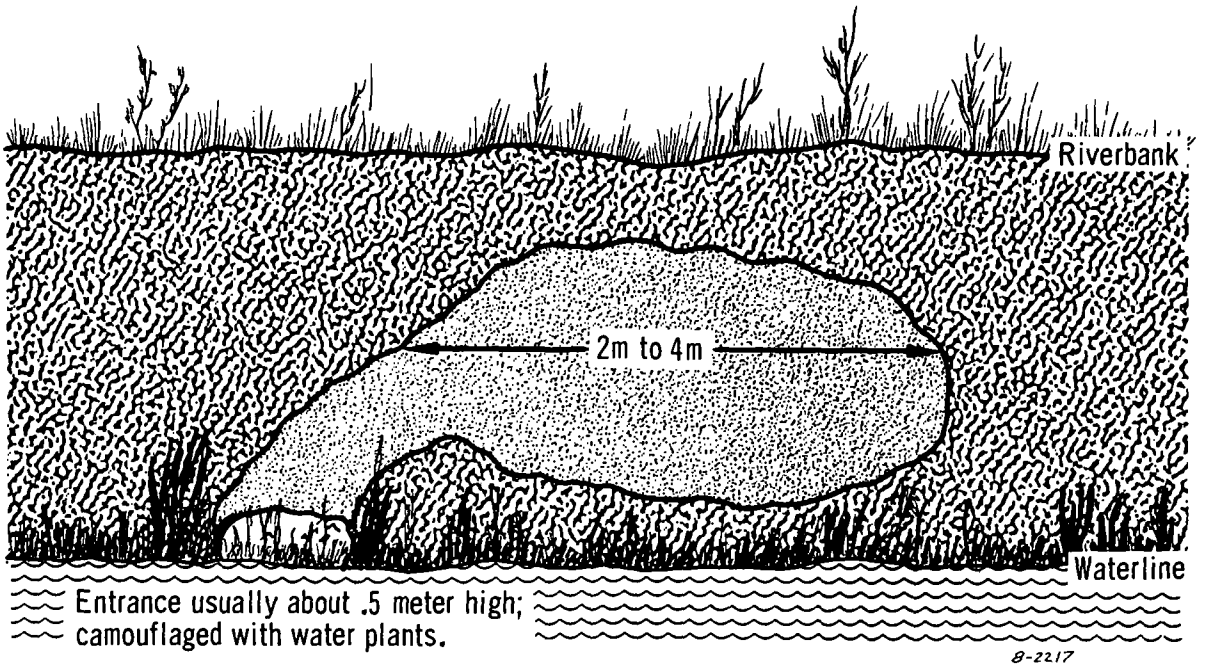
(1) FM 7–20 contains a description of the use of the ground surveillance section.

(2) During the water movement phase, radar sets may be attached to the reconnaissance platoon embarked in assault boats. Once the battalion combat base is established, the section normally provides general support to the base. When the situation permits, radar sets may be attached to rifle companies for night defense. Watercraft or helicopters are used to transport radar sets within the AO.

Section IV. ENEMY POSITIONS

4–16. Types of Enemy Positions

Enemy forces use tunnel complexes and caves extensively as hiding places and caches for food and weapons. Often the tunnel complexes, always expertly camouflaged, are the result of many years of labor. Not all tunnels are com-



This type of cave usually has entrance from below waterline to about .5 meter above. It can only be entered from the water. There is about a .5-meter approach leading to the main room which is circular and about 2 to 4 meters across.

Figure 4–10. Typical cave in a riverine area.

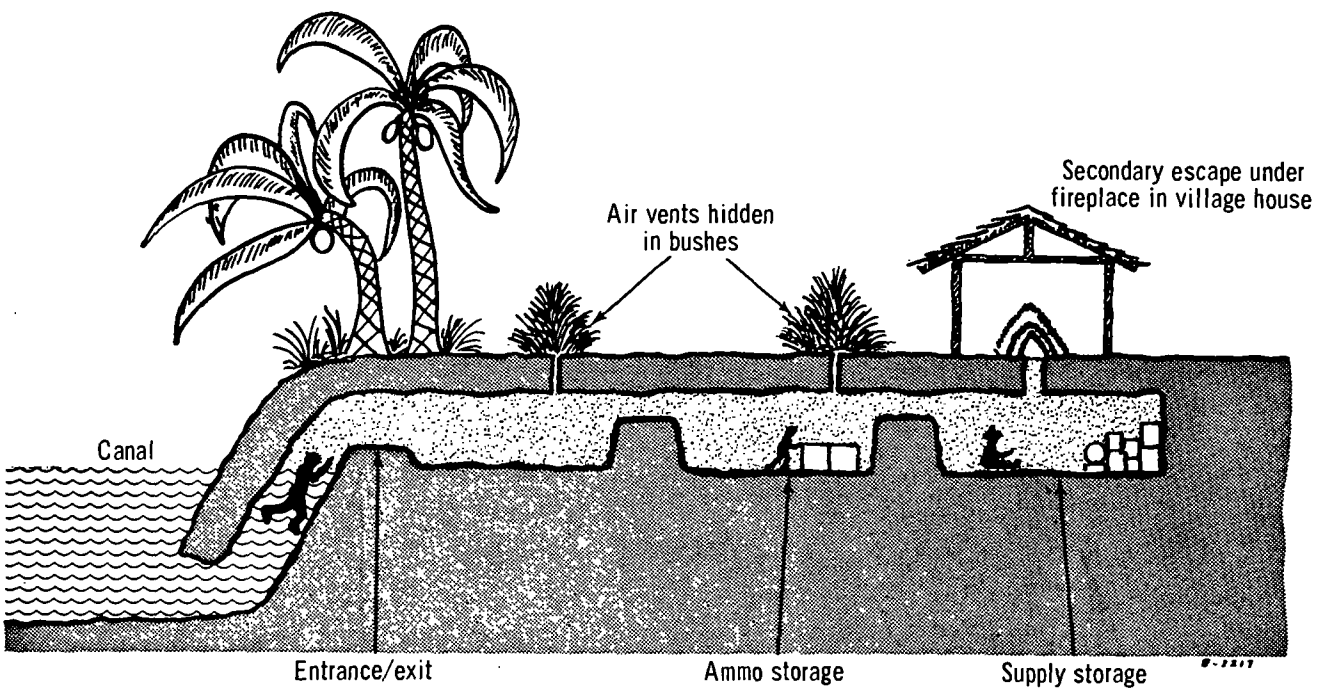


Figure 4–11. Typical guerrilla base.

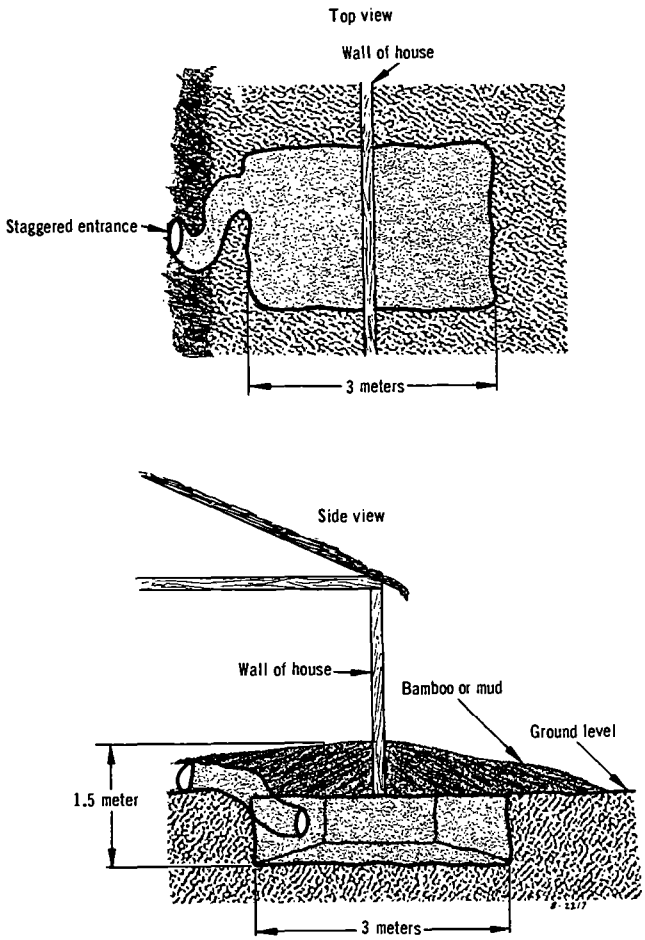


Figure 4–12. Typical hiding place under a house.

pletely underground. In a riverine area where the water table is comparatively high, long, narrow trenches may be dug and then shored and covered with matting. Figures 4–10 through 4–17 illustrate typical enemy positions that may be encountered.

4–17. Clearance of Tunnel and Cave Complexes

a. As soon as a tunnel or cave complex is discovered, interpreters urge occupants to surrender. Smoke, CS grenades, or flame is used to force occupants to leave small complexes. The "Mity Mite" has the capability of moving 450 cubic feet of air per minute and can drive smoke and/or CS throughout a complex. Colored smoke is useful in identifying concealed entrances and air vents. The Mitey Mite is also used to evacuate smoke and CS from a complex before search parties enter.

b. When a tunnel or cave complex is discovered, the area around all known entrances and exits is secured to prevent the escape of any occupants. A search party is designated and examines the entrance carefully for mines and boobytraps. Personnel entering the complex are connected with one another by ropes attached to their waists, and they are provided wire communications with elements on the surface.

(1) The search party moves through the complex probing for mines, false walls, hidden entrances, and caches of arms and supplies. They note and plot airvents. They report compass readings and distances to the surface for recording. A second party maps the tunnel from the surface and maintains a position above the search party by following the compass readings and distances as reported by the search party.

(2) As other entrances are discovered, they are marked to show use after discovery. If the complex is too extensive to be searched in 1 day, the enemy may enter it during the night and bobbytrap approaches, entrances, and exits.

4–18. Destruction of Tunnel and Cave Complexes

a. Units usually carry conventional explosives, such as TNT, composition C–4, cratering charges, shaped charges, and bangalore torpedoes, to destroy tunnel and cave complexes. Acetylene gas-generating and dispensing units are less satisfactory in tunnel destruction, but are effective in loose soils with limited overburden (less than 2 meters). Regardless of the explosives used, all tunnel openings are sealed prior to detonation of charges. The electric firing system has the advantages of being safer and of giving instantaneous control over the time of detonation, but nonelectric firing systems are frequently used because of the ease in carrying the materials. Complete destruction of tunnel complexes is preferable, but is rarely feasible from the standpoint of effort and materials/explosives required in systems of great depth, length, or in extremely hard soil.

b. The enemy usually attempts to reconstruct a complex that has been destroyed by explosives because reconstruction requires less

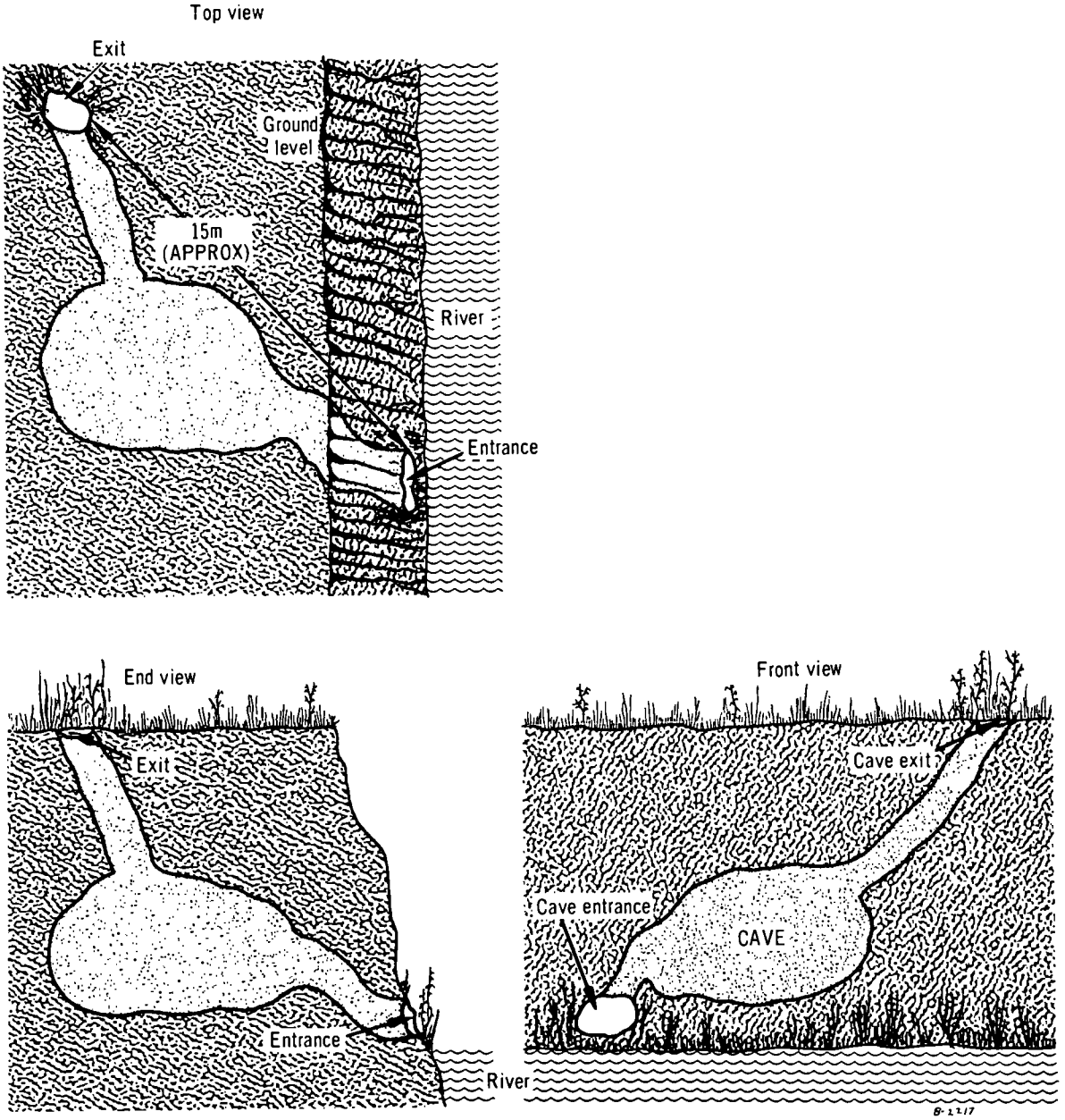


Figure 4–13. Typical cave in a riverine area.

work than digging a new one. Units conduct searches periodically to continue to deny the enemy access to complexes that have been destroyed.

c. When time and supplies are limited, denial of the tunnel and cave complex may be more effective than destruction. Complex denials are normally accomplished through the dissemination of aerosol CS within the complex. Micropulverized CS may be dispersed within underground installations by placing CS powder on detonating cord strung throughout the complex and detonating the cord. Additional information on complex denial can be found in TC 3–16.

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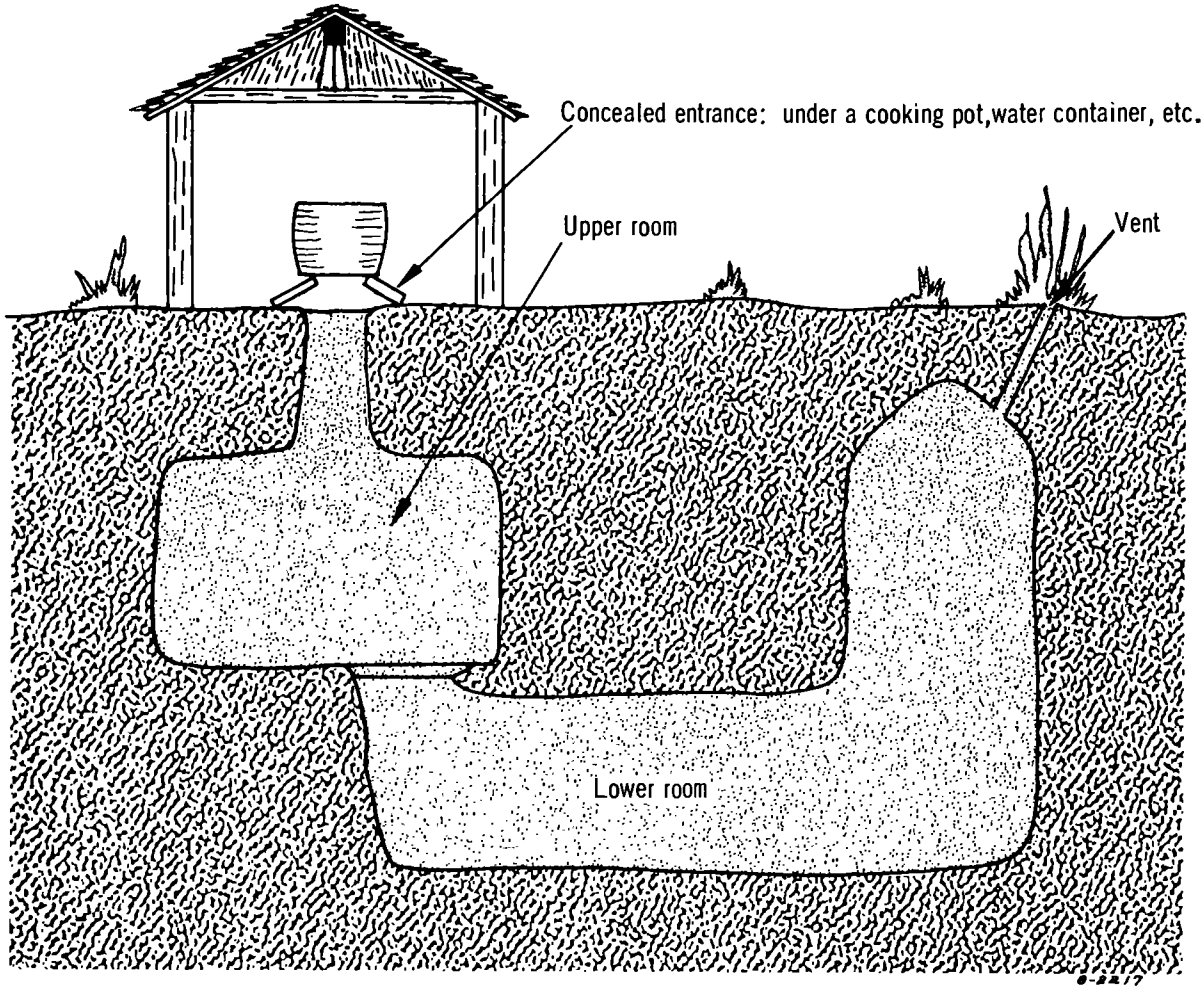
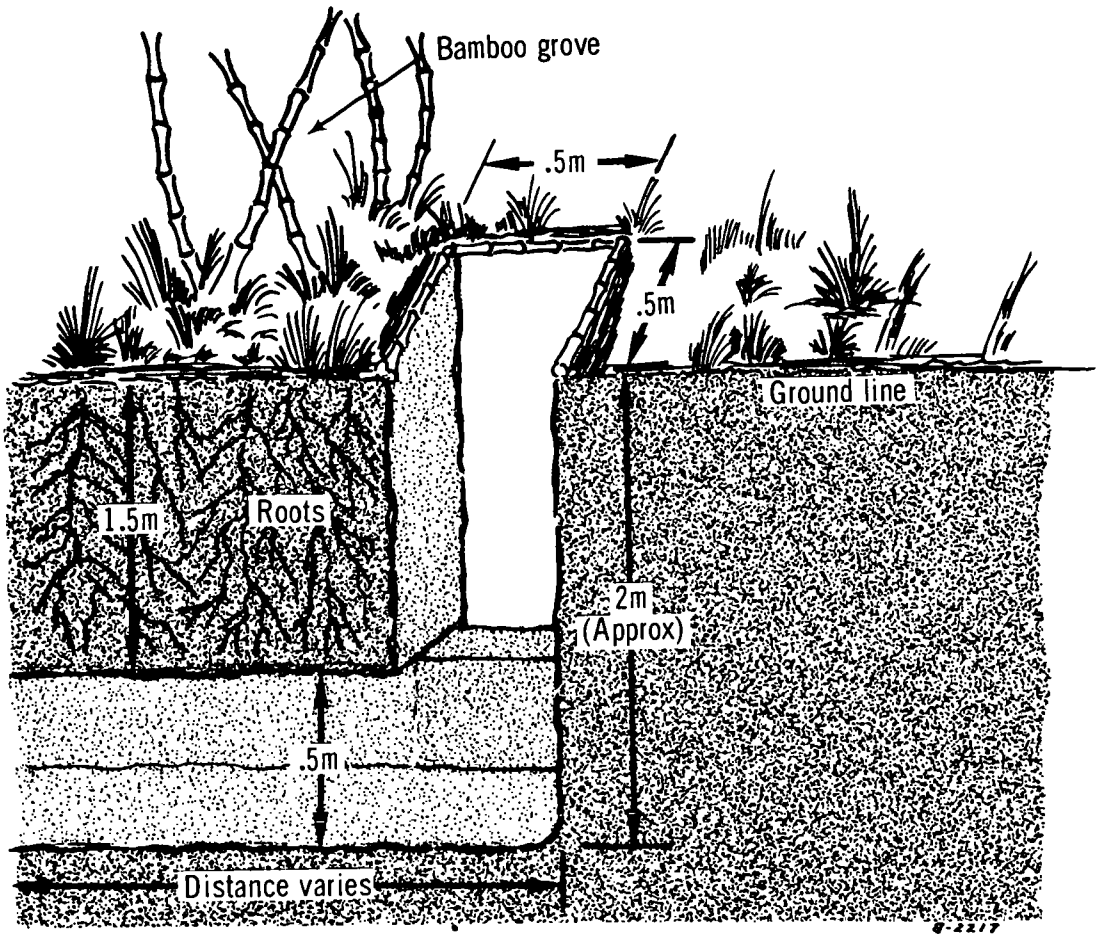


Figure 4–14. Typical rooms under houses.



NOTE: Tunnel is cut under bamboo grove. Root system is excellent reinforcement for roof of cave. Horizontal tunnel may go to another fighting trench.

Figure 4–15. Typical tunnel entrance.

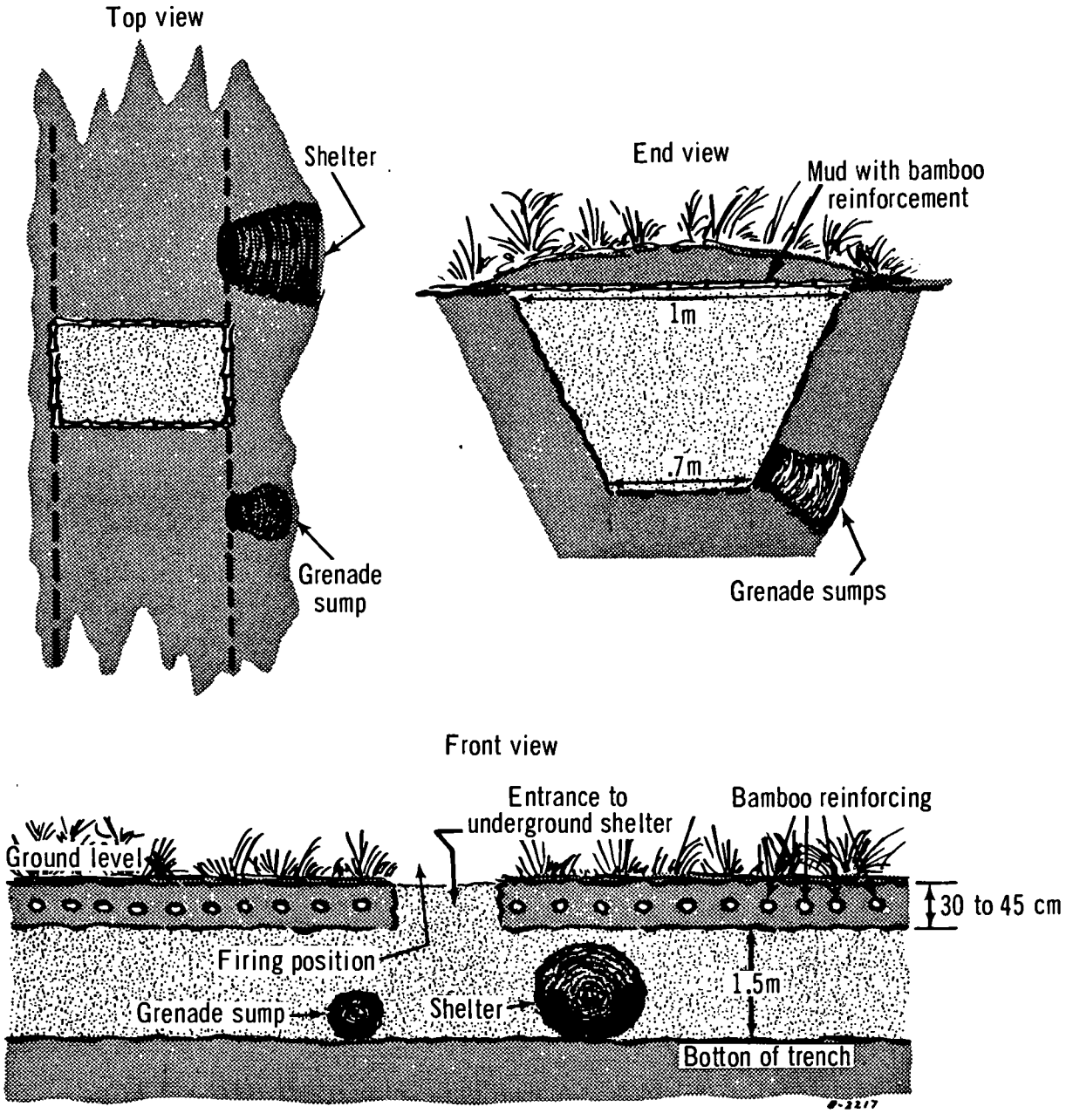
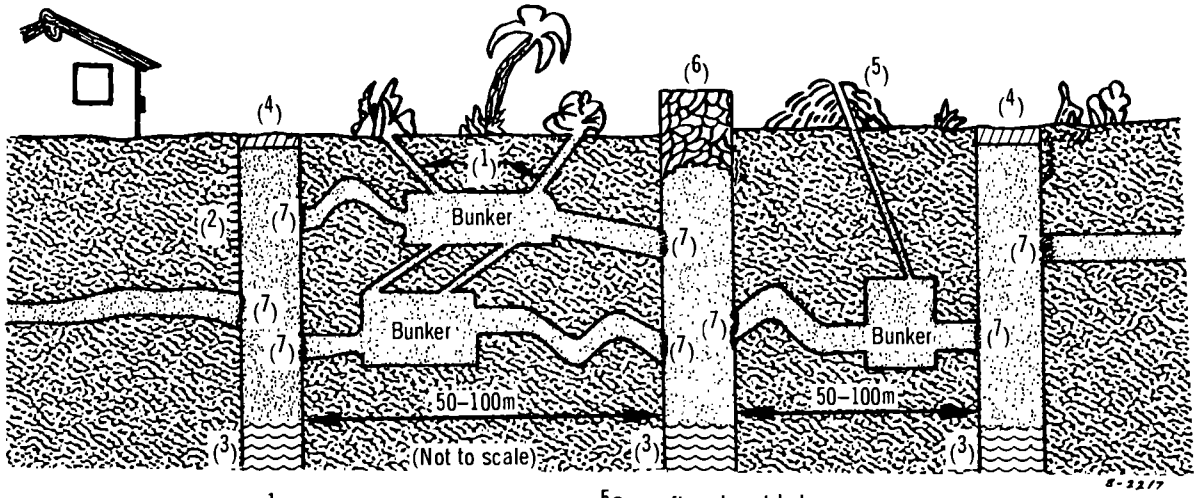


Figure 4–16. Typical tunnel with firing position.



[1]Air vents.
[2]Notched dirt steps.
[3]Water.
[4]Camouflaged well covers.
[5]Camouflaged vent hole.
[6]Well.
[7]Camouflaged entrance/exit.

A series of multi-bunker tunnels with angled connecting tunnels. Each bunker has space for 15 to 20 men. The entrances and exits from the bunkers are built into the walls of actual or simulated wells 20 to 30 meters deep. Access to the camouflaged entrances/exits is gained using notched dirt steps on the inside of the well or long notched bamboo pole ladders. The camouflaged wells also serve as deep pit man traps.

Figure 4–17. Well-tunnel complex.

CHAPTER 5
OTHER TACTICAL OPERATIONS

This chapter provides guidance for conducting operations unique to a riverine environment or modifications to normal procedures required because of the environment. Units conducting operations in a riverine area may participate in one or more of the operations described and are expected to maintain proficiency in all. These operations may be separate or combined with the operations discussed in chapters 4 and 8.

Section I. PATROLLING

5–1. General

The terrain, the presence of large numbers of noncombatants in the area, and the activities of the enemy require modification of normal patrol techniques. In a riverine environment, enemy forces use the waterways to move troops and supplies in support of their operations. The waterways are the focal point for all enemy and noncombatant activities and are the lifestream of the area. Because the area is densely populated, the enemy can mix freely with the local civilians, with slight chance of identification.

5–2. Types of Patrols

Patrols may be either long or short range and are generally classified as security, combat, or reconnaissance.

a. Security Patrols. When frontlines are nonexistent and base areas are under constant threat, the requirement for patrols to provide security for the base increases. The patrol area may contain friendly units and heavy population concentrations. Enemy agents, mixing freely with local residents, easily gain information on the location of outposts and routine patrol routes. Outposts and patrol areas are changed at random intervals to hamper the enemy intelligence-gathering agencies. Waterways near the base require particular attention because they permit the enemy to position heavy weapons and assault elements for an attack on the base.

b. Combat Patrols. FM 21–50 and FM 21–75 contain detailed information on planning and conducting combat patrols.

(1) Saturation patrols or patrolling consists of a large number of lightly armed, small patrols in a relatively limited area. The name is derived from the fact that the area is saturated with patrols. To prevent one patrol from attacking or ambushing another requires careful selection of routes, scheduling, and close coordination between patrols. A combination of water, ground, and airmobile means of transportation may be used in patrolling.

(2) Airmobile hunter-killer teams are combat patrols transported by helicopter that are escorted by armed helicopters. They are capable of covering large areas and may be used as a reaction force.

(3) Ambush patrols establish ambushes at selected positions to destroy enemy elements.

c. Reconnaissance Patrols. Reconnaissance patrols collect information of the enemy, terrain, and weather in a prospective area of operations (AO). They avoid contact when possible and fight only in self-defense or when necessary to accomplish the mission. A five- to eight-man patrol normally is required for reconnaissance missions. Typical missions or specialized reconnaissance patrols follow:

(1) Engineer patrols collect information of river obstacles; fortifications; roads, minefields; and bridges, to include underbridge clearance at high and low tide, water depths at high and low tide, clearance height and width between bridge piers.

(2) Naval patrols collect information of major waterways, to include hydrographic conditions, location of water obstacles, planned ambush sites, mines, etc.

(3) Artillery patrols collect terrain information required for the selection of artillery positions to include accessibility, availability, defensibility, and ground condition.

5–3. Means of Transportation

All available means of transportation are used in a riverine environment. Movement of patrols consists of three phases: insertion into, operations within, and extraction from the operational area. The means of transportation used during each phase depends on the variables of speed, terrain, degree of covertness necessary, and equipment. The following paragraphs describe considerations for selecting the means of transportation.

a. Fixed-wing aircraft are fast and relatively unrestricted in the amount of equipment they can deliver. Personnel and equipment are delivered by airlanding or parachute. A night parachute drop offers a better possibility of maintaining secrecy than a day drop; however, it may result in unacceptable dispersion of the patrol and equipment. Equipment is normally restricted to items that the patrol can carry unless time is available to rendezvous with other means of transportation.

b. Helicopters can insert a patrol into the operational area as a unit, with its equipment and boats for transportation in the area, if required. Helicopters can be easily seen and heard from a great distance, but their use precludes the necessity of a rendezvous once the patrol lands. Helicopters provide a rapid and reliable means of transportation into the operational area and extraction therefrom.

c. River assault squadron (RAS) craft are used to insert patrols and their equipment, including assault boats or armored personnel carriers (APC), into the AO. RAS craft provide fire support and resupply and may extract the patrols.

d. Assault boats are used for insertion into, movement within, and extraction from an AO. When using assault boats, a patrol can move faster and carry more equipment, weapons, and ammunition than when dismounted. Movement by assault boat does not normally provide as much secrecy as movement dismounted; however, moving at night, drifting with the current, paddling or poling, and being able to accelerate quickly to speeds in excess of 25 knots provide some security. Appendix C contains techniques for using assault boats.

e. Indigenous watercraft assist in deception and can either substitute for assault boats or supplement them. These craft arouse less suspicion than assault boats.

f. Airboats and air cushion vehicles (ACV) are used for insertion into, movement within, and extraction from the AO. The noise of these craft is a major consideration because secrecy of movement is virtually impossible; however, their speed is such that enemy reaction to the movement may be impossible. These vehicles can also be effective as part of a cover or deception to divert attention from patrols in the area.

g. Dismounted patrols in a riverine environment are limited in speed of movement, ability to remain in the AO, and ability to transport required supplies and equipment. The terrain and the physical strain on dismounted elements operating in inundated areas are limitations on patrol operations. Operational range and duration are limited. When consistent with the mission, dismounted patrols are provided transportation.

5–4. Long-Range Patrols

a. All available transportation is used in long-range patrols. These patrols frequently perform a series of missions within the AO.

b. Detailed planning for insertion into the operational area and extraction therefrom is required when a unit conducts long-range patrols. Physical limitations of patrol members are a major consideration in planning these patrols. Patrol planning includes coordination with friendly waterway patrols operating in or adjacent to the operational area. These waterway patrols may provide resupply, fire support, and extraction or ferrying to the long-range patrol.

5–5. Night Patrols

Night saturation patrols deploy to locate enemy forces, interdict lines of communications

(LOC), and prevent raids or harassing attacks. Darkness or reduced visibility allows patrols to move with less chance of being detected, but increases problems of control. Maximum use of light intensification, surveillance, and listening devices increases the effectiveness of night patrols. Aircraft, using similar devices, assist night patrols in land navigation.

5–6. Motorized Patrols

Motorized patrols are conducted in riverine areas containing a suitable road network. Normally, wheeled vehicles are more suitable than tracked vehicles because of the reduced noise levels, but they may be road bound. The techniques of motorized patrols described in FM 21–75 apply, with particular emphasis on security during the march and during halts.

5–7. Employment of Scout Dogs

Scout dogs are effective, particularly during searches and night operations. A dog in good physical condition can work effectively in rice paddies for about 6 hours. Scout dogs are also useful with patrols and ambushes.

Section II. RAIDS

5–8. General

a. A raid is an attack by a force to accomplish a specific purpose in enemy territory with no intention of gaining or holding terrain. Surprise, firepower, and violence of action are the keys to a successful raid. The principles involved and techniques used in raids in a riverine environment are basically the same as those listed in FM 6–20–2, FM 17–1, FM 21–75, FM 31–12, and FM 61–100.

b. In a riverine environment, vegetation limits visibility and affords excellent concealment. In this type of terrain, raids may produce results unobtainable by other operations. Squads, platoons, or companies conduct raids.

5–9. Planning Considerations

a. Movement and control are hampered by terrain, vegetation, weather, and limited visibility. Elements conducting raids are armed with light infantry weapons and carry the minimum equipment. Weapons include shotguns and M–79 grenade launchers and the maximum of automatic weapons. These weapons are particularly suitable since raids are normally conducted during reduced visibility and fires are delivered at short ranges. Grenades cause casualties among the enemy and provide smoke to cover the withdrawal. Personnel selected to participate in a raid require endurance and stamina.

b. Use of all available intelligence and detailed coordination of all supporting fires are necessary in planning a raid. Personnel are selected in advance and trained in the conduct of raids to prevent delay when the opportunity for a raid occurs. Training stresses land navigation and use of the compass. Friendly, reliable, and trustworthy indigenous guides or host country troops assist the raiding party in cross-country movement.

c. Rehearsals, essential to precision and speed in carrying out a raid, follow a plan similar to that for the forthcoming operation.

d. Maximum security measures are enforced to insure the success of the raid and to prevent an ambush of the raiding party. Cover plans and ruses are employed to deceive the enemy about the planned raid.

e. The withdrawal is planned in detail. Plans include alternate routes and means of transportation and ambushes along the route of withdrawal to assist in the extraction of the raiding party. Air, artillery, and naval gunfire support are planned for the withdrawal phase.

f. Marshy areas, covered with tall reeds and scrub growth, hinder movement of assault boats. Since indigenous watercraft traverse these areas with less difficulty than assault boats, commanders consider their use.

5–10. Raid by Fire

Although not outlined in FM 6–20–2 as a normal artillery operation, artillery units, using massed, surprise fire, can conduct successful raids by fire within the definition in paragraph 5–8. Coordination with the sector operations and intelligence coordination center (SOICC) or combat support coordination cen-

ter (CSCC) reveals lucrative targets for artillery raids by fire. This raid by fire may be accomplished from the normal supporting positions. When not required to support operations or provide fire support for base defense, artillery units move to a suitable location and conduct raid by fire. A sudden, large volume of fire is directed at previously selected targets. On completion of firing, the artillery unit returns to the base area and another unit or agency conducts and reports target damage assessment.

5–11. Mechanized Units

Mechanized units are well suited for raids in open marsh areas. Their speed of movement and their cross-country mobility reduce the enemy's capability to counter or prevent the raid. Mechanized units, using naval craft, are transported from the base to a landing site near the objective, debark, and move rapidly onto the objective. The APC's amphibious characteristics allow it to be off-loaded in places where a shallow bottom prohibits the landing ship from reaching the shore. Mechanized units, logistically self-supporting for short periods, can reach objectives in enemy territory. As with other raids, mechanized units require aviation support for reconnaissance and surveillance, fire support, medical evacuation, and resupply.

5–12. Water Movement

a. Watercraft provide a rapid means of transportation to the objective and withdrawal therefrom. Waterborne elements debark at a distance from the objective and approach the objective on foot. If the objective is near a waterway, the assault element uses powerboats to move directly into the assault area. This tactic is used only when surprise can be achieved and the waterway is large enough to permit the boats to take evasive action. Supporting fires and smoke are planned to cover the withdrawal.

b. When the objective is close to a waterway and the enemy has concentrated his defense for protection of the installation against waterborne attack, a diversionary attack may permit trained personnel to enter the target area for destruction of selected facilities.

Section III. OPERATIONS IN SWAMPS AND FORESTS

5–13. General

Operations in swamps and forests are conducted in a manner similar to the jungle operations outlined in FM 31–30. These operations normally are conducted by dismounted elements. The complex of mangroves, ferns, and palms normally found in these areas offers excellent concealment for the enemy and is frequently used by the enemy for base areas and safe havens. When used for these purposes, enemy installations are usually located in areas close to streams to utilize the waterways for transportation of supplies and equipment. Extensive operations are conducted in these areas to defeat the enemy or deny him use of the waterways.

5–14. Military Characteristics

The dense vegetation and inundated areas in this environment hinder movement. Critical terrain in a swamp or forest includes trails, streams, rivers, coastal areas, small villages, and built-up areas. Air observation is limited, and ground observation may be limited to as little as 1½ meters. Concealed movement is possible throughout the area. Dismounted elements can operate in inundated areas for limited periods; however, the mission can be accomplished by rotating units and using all available firepower.

5–15. Command and Control

Operations in these areas are conducted primarily by small units as separate engagements. Control of supporting fires and maneuver elements is difficult because of the dispersed actions. Dense foliage reduces the distance that organic electronic, audio, and visual means of communication can transmit messages. Trustworthy indigenous personnel familiar with the terrain or troops from the host country who have operated in these areas assist units during the operation.

5–16. Movement

a. Foot movement is normally restricted to narrow trails; boat movement within swamps is usually restricted to streams within the swamp; and helicopter landing sites are few. Pathfinder teams are used to insure that available helicopter landing sites are not booby-trapped. During operations, aerial ladders assist in inserting or extracting elements. A waterborne approach from the sea into coastal swamp area may be difficult because of shoals, shifting channels, and tidal effects. The use of ACV's may partially overcome these difficulties and allow more freedom of movement within the swamps.

b. Units converge on suspected enemy base areas. Units, with minimum equipment, using watercraft to negotiate streams and waterways, are trained to move as fast as or faster than the enemy.

5–17. Fire Support

Supporting fires are planned in detail to support engaged forces, to destroy the enemy and his equipment, and to interdict his movement. Napalm is an effective weapon, but planners consider all available weapons during planning and weapon selection for fire support. Scarcity of information concerning the strength and disposition of the enemy requires planned fires for a greater number of contingencies. The positioning of conventional artillery is often difficult in swamps; therefore, barge-mounted or helicopter-emplaced artillery is employed when possible (ch 6). Since observation is normally restricted to a few meters, forward observers are trained in sound sensings. Coordination between air and ground observers is necessary to verify location of friendly troops and to obtain positive sensing of rounds fired. Frequently, Air Force and Army aircraft and Navy elements provide the preponderance of fire support.

5–18. Tides

In swamp areas affected by tides, the tidal influence on currents, depths of water, and bank and bottom conditions of canals and tidal streams is an important consideration for waterborne elements. Tidal effects and physical characteristics of the area are considered during planning for operations.

5–19. Denial of Drinking Water

In many riverine areas near the sea, drinking water is scarce. Streams may be of a tidal nature; the normally low elevations preclude deep wells; and water in natural reservoirs is normally not suitable for drinking. All personnel living in this type of area entrap water during wet seasons and store it in manmade ponds or metal or pottery containers. Units conducting operations in swamps or marsh forest areas destroy stored water supplies. Patrols along waterways assist in preventing the enemy from importing water.

Section IV. AMBUSHES/COUNTERAMBUSHES

5–20. General

Ambushes are employed by both sides in a riverine environment. Because both waterways and roads are LOC, many ambush sites are available to both friendly and enemy forces and the requirement for counterambush tactics increases. FM 21–75 provides additional details on ambushes and counterambushes.

5–21. Ambush Operations

a. Concept.

(1) Units involved in base security use ambushes as a security measure (ch 8). Ambush patrols may enter enemy territory by boat or helicopter or on foot to interdict canals or other suspected enemy routes of movement. Cover and concealment for the unit conducting the ambush are essential.

(2) Surprise is the key to success in ambush operations. Surprise allows the ambush force to seize and retain control of the situation. Units achieve surprise by careful planning, preparation, and execution.

(3) Units maintain close control during movement to, occupation of, and withdrawal from the ambush site.

(4) All available weapons, including

mines, demolitions, artillery and mortars, and close air support are coordinated to achieve maximum effectiveness of the ambush.

b. Planning.

(1) Ruthlessness and violence are characteristics of ambushes. Use of all available intelligence and detailed coordination of all supporting fires are necessary during the planning phase. The maximum number of automatic weapons is used at the ambush site. Movement is a critical factor when an ambush force exfiltrates from the area after completing the ambush.

(2) Excellent ambush sites are available along rivers, canals, roads, or converging rice paddy dikes in a riverine environment. Before selecting an ambush site, commanders make a careful study, using maps, aerial photographs, and when possible, a personal reconnaissance of the area to determine the availability of natural obstacles. Minefields create artificial obstacles to supplement natural obstacles. The claymore antipersonnel mine is effectively employed in the killing zone and in preventing the enemy's escape. In a successful ambush, the enemy is destroyed at the ambush site.

(3) Commanders select routes to and from the ambush site carefully to insure secrecy when occupying the positions and speed and security when withdrawing from them. They select alternate routes or withdrawal and designate rally points and assembly areas.

(4) Communication and control procedures are necessary during the movement to, occupation of, and withdrawal from an ambush site. Strict control and discipline are necessary to keep the ambush unit alert and silent. Movement and communications are kept to a minimum once the ambush unit is in position. Communications are necessary to issue orders to open fire and withdraw, as well as to maintain contact with local security elements and higher headquarters. An alternate plan provides for opening fire when the lead elements of the enemy reach a designated location.

(5) Rehearsals for the ambush force are conducted on terrain similar to that for the actual mission. All personnel are thoroughly briefed on the exact sequence of events until they thoroughly understand their duty. The location of rally points, assembly areas, and withdrawal routes are known to all personnel. All personnel must participate in the rehearsal until every single individual knows each aspect of his job on the move, at the rally points, at the objective, during the ambush and throughout the withdrawal.

(6) Personnel and weapon positions provide cover and concealment. The fire plan integrates the fires of all weapons, automatic weapons, grenade launchers, and claymore mines. The ambush plan includes the signal to open and cease fire, the assignment of sectors of fire, and the location of all elements. Planned fires isolate the ambush area and prevent the escape or reinforcement of the enemy. Commanders insure that the large volume of surprise fire in the killing zone comes from at least two directions and converges on the target.

c. Execution.

(1) The moment when the enemy arrives in the killing zone is the most crucial in an ambush. When the enemy force enters the killing zone and reaches a designated location, the order is given to open fire. All weapons deliver a large volume of fire into the killing zone to inflict maximum casualties before the enemy can take cover. Fire continues until the enemy is annihilated or until a friendly assault element is committed.

(2) The use of assault elements in an ambush is often necessary. These elements move through the ambush site, destroying equipment, searching the dead, and performing any other duty that the ambush commander directs. The assault begins with the lifting or shifting of supporting fires.

(3) During ambushes along waterways, offensive grenades are thrown into the water. The concussion of the exploding grenades produces casualties among swimmers. Boats are used by assault elements to capture prisoners.

d. Use of Assault Boats.

(1) When assault boats transport an ambush force, they move stealthily by using paddles or poles instead of motors, or by drifting into position with the current or tide. When they move this way, the motor is fastened to the boat in the up position, ready for immediate use.

(2) Whether an ambush site is selected to cover a road, trail, or waterway, the ambush

force debarks and occupies concealed positions. The boats are concealed, and designated crewmen remain in or near their craft prepared to assist in the ambush or in the withdrawal.

(3) If the ambush site is on a tidal waterway, changes in the water level and the direction of flow are considered in the plan. A considerable change in water level may prevent withdrawal by boat.

5–22. Counterambush Tactics

a. General.

(1) The riverine environment offers the enemy many opportunities for ambushes. The population provides a cover for enemy ambush forces' movement into and occupation of ambush sites. Accordingly, the riverine area is rarely considered secure, and counterambush measures are planned in conjunction with all operations and movements.

(2) When moving through open or broken terrain, security elements are employed to the front, rear, and flanks of the moving column, out to the maximum effective range of small-arms fire. In wooded areas, security elements are a minimum of 200 meters forward and must cover a front broad enough to prevent a line ambush, in which the long axis of the enemy parallels the direction of movement. The forward security elements are far enough to the front to allow the main body to deploy without serious interference from the enemy. When movement is along a canal or river, units may take advantage of adjacent canals to move security elements.

(3) Routes of movement are reconnoitered in detail from the air; by map; and, if possible, by small reconnaissance patrols. Air observation is valuable, but it is not a substitute for ground reconnaissance. An ambush force, once in place and camouflaged, is not likely to be detected from the air.

(4) Local activities along roads or waterways are carefully observed to detect unusual patterns of behavior. The absence of children in the area or the absence of vehicular or boat traffic may indicate the presence of an enemy ambush force. If the mission permits, frequent questioning of local civilians about recent enemy activities in the vicinity may be advantageous.

(5) Security is maintained from the beginning to the end of any movement; and dispersion, combat formations, and observation are emphasized. Troops have a tendency to relax and become careless when returning to a base area from an operation. This tendency increases as the units near the base area. Recognizing this fact, enemy forces have conducted many ambushes within 500 to 1,000 meters of the base area.

(6) Details on employment of Army aviation in counterambush operations are in paragraphs 6–40 through 6–43.

b. Planning Counterambush Actions.

(1) All movements and operations are susceptible to ambush. In any movement, representatives from supporting artillery, tactical air, Army aviation, and Navy units participate in the planning. During initial planning, the commander decides whether air relay and observation are required for positive communications and control and whether an airborne command post is necessary. The airborne command post affords the commander the best means of control and communications and enables him to react rapidly to all contingencies.

(2) Plans for column cover and reaction elements provide support for all operations. Reaction elements must constantly be prepared for immediate dismounted employment. The reaction element may attack the ambush force or may maneuver to block the enemy's withdrawal. Column cover provides observation and fire support to both the moving unit and the reaction force.

(3) During planning, the commander designates the sequence of command succession, considers intelligence indications, has a detailed fire support plan prepared, and plans for the placement of forward observers and tactical air controllers. If movement is by water or if naval gunfire or RAS fire support is available, these fires are integrated into the counterambush plan.

(4) Plans are made to brief and rehearse all personnel concerning their individual responsibilities and duties if ambushed. All personnel, including embarked troops and the supporting boat crews, are familiar with the plan for immediate action, control procedures, and artillery and tactical air support available.

c. Counterambush Actions on Land.

(1) *Preparation of vehicles.*

(*a*) Sandbagging the floorboards of all vehicles lessens the effects of mines on personnel. Stacking sandbags against the sides of unarmored vehicles provides protection from small-arms fire. Placing additional ammunition and grenades in each vehicle insures that adequate quantities are readily available. Lightweight armor kits are used on trucks to provide wraparound protection against small-arms fire.

(*b*) Removal of the side panels and lowering of the tailgates are necessary on wheeled vehicles that carry troops. When seats are used, they are in the center of the vehicle so that troops sit back to back and face outward. When seats are not used, the troops sit or lie in the bed of the truck facing outward. During all movements, personnel are organized to return fire by designating sectors of fire to both flanks.

(*c*) All vehicles are equipped with towropes or chains. Convoys are normally organized with the slowest vehicles at the head of the column; however, distribution of weapons, security, etc. may dictate otherwise. Drivers are told the interval that they are to maintain. Ambush forces normally try to block the road by disabling a lead vehicle. Drivers have instructions to pass disabled vehicles and to keep the column moving to clear the killing zone. Recovery vehicles follow at the rear of the column to recover disabled vehicles.

(*d*) Vehicles in convoys do not carry a full load of personnel or equipment. If vehicles are loaded to their maximum, troops will be unable to use their weapons effectively; therefore, a 2½-ton truck carries, as a maximum, 18 persons. Unit integrity is maintained when possible.

(2) *Reaction to enemy ambush.*

(*a*) When a unit is caught in an ambush, troops return fire in their assigned sectors. The unit is organized to cover the entire area with a large volume of fire, and troops gain and maintain fire superiority. The unit increases speed and continues movement unless the road is blocked. If movement stops, troops return fire immediately with organic weapons and follow up with an assault on the primary ambush, using their individual weapons in conjunction with white phosphorous (WP) grenades and supporting fires. Units entirely in the kill zone (fig. 5–1) assault and overrun the ambush positions. When only part of the unit is caught in the killing zone (fig. 5–2), the elements not in contact act as a maneuver force and attack the flanks and rear of the ambush. Personnel continue to fire even after the enemy ceases fire to prevent the enemy's recovery of weapons and bodies. After overcoming the ambush, the area is searched to insure that the ambush site is clear.

(*b*) Troops moving through suspect areas carry WP and offensive grenades. When ambushed, they immediately throw grenades toward the enemy. Enemy ambush forces often hide at very close range and assault only after the friendly force has been attacked by long-range fire. Besides producing casualties, the WP grenade produces a smokescreen that limits the enemy's observation and helps make his fires ineffective. Offensive grenades may inflict heavy casualties on the concealed force and often prevent its making an assault.

(*c*) The immediate reaction plan provides for an assault to overrun the enemy positions. Enemy ambush forces often fire from only one flank to make the friendly force take cover in a mined area or killing zone. An assault toward the enemy normally lessens friendly casualties and produces more enemy casualties.

d. Counterambush Tactics During Water Movement.

(1) *General.*

(*a*) Even though suspected ambush sites along waterways have been attacked by artillery or close air support fires, ambushes may be encountered. The enemy generally selects ambush sites on waterways at points where maneuvering is difficult and the channel either brings the craft well over to one bank or restricts them in a narrow channel. Ambush forces usually hide in dense vegetation; but, in some areas, they conceal themselves in rice paddies or tall grass. High banks provide advantageous firing positions above the river craft and limit the range of friendly direct fire. Avenues of withdrawal are normally available to the enemy. Mudflats, steep banks, or slippery shores hinder friendly troops assaulting from the river.

(*b*) Normally, the friendly unit counters the ambush with suppressive fire and

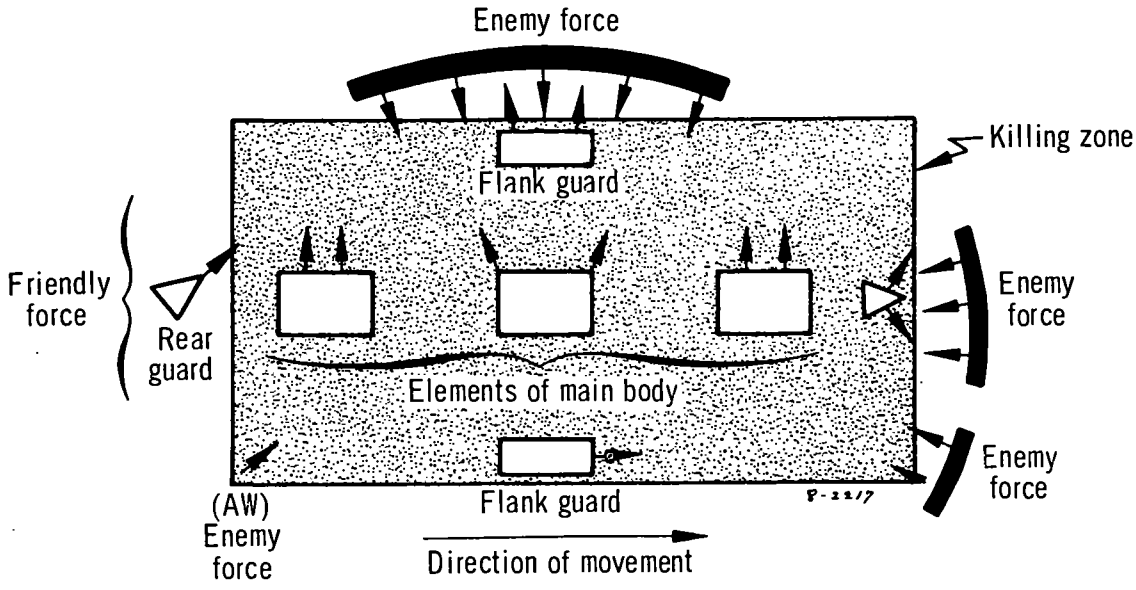


Figure 5–1. Reaction when entire unit is caught in killing zone.

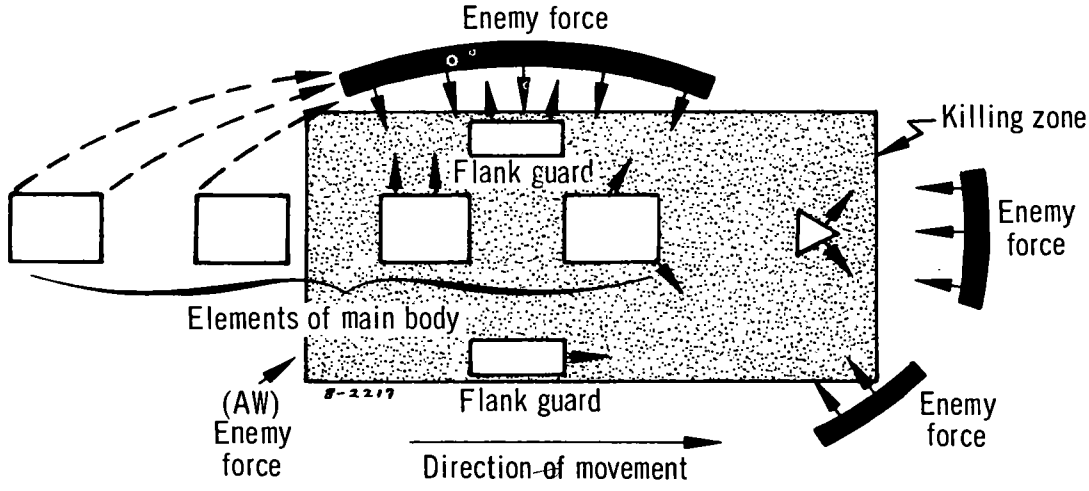


Figure 5–2. Reaction when a portion of a friendly unit is caught in killing zone.

forward movement; it commits an element to suppress the ambush while the main body moves through the killing zone. The alternate course of action is to commit the entire unit in a coordinated attack to assault and annihilate the ambush force. The mission, the forces available, and the relative size of the ambush force determine the tactic to employ.

(*c*) If a commander plans to counter the ambush with suppressive fire and forward movement, his plan includes the designation of ships and watercraft to take the ambush force under fire. The plan also includes instructions on the use of artillery and close air support. If the unit's mission specifies destruction of any ambush forces encountered en route, plans are necessary to land elements for this purpose and to commit blocking forces or reserves.

(2) *Planning.*

(*a*) Reconnaissance of the selected waterway is conducted at both high and low tide to determine navigability under these conditions. The commander considers the use of

parallel rivers, streams, and canals by security elements. When time permits, reconnaissance patrols, well forward of the main body, debark and investigate likely ambush sites. When scout dogs are available, they are used along the banks or in small boats near shore to detect ambush sites. Since the return route of boats is easily predictable, plans provide for the use of alternate routes. When this is not possible, units avoid setting a predictable time pattern of return from operations.

(*b*) The plan allocates transportation for the evacuation of casualties and damaged equipment. Army troops may augment Navy crews to replace losses.

(3) *Execution.*

(*a*) When ambushed, the waterborne force normally maintains forward movement and executes a coordinated plan for suppressive fire, aimed fire to neutralize major weapons, planned artillery or RAS supporting fires, and close airstrikes. When the ambush is activated and only a portion of the unit is in the killing zone, fire support craft (monitors and assault support patrol boats (ASPB)) immediately maneuver to take positions between the armored troop carriers (ATC) and the ambush force. The fire support boats attempt to suppress fire until the ATC are past the killing zone; then they disengage and re-form for movement (fig. 5–3).

1. Troops embarked in ATC's remain but are ready to establish local security if an ATC should be beached. These troops are ready to assist in the recovery of damaged watercraft and to man Navy guns if the ATC crew is engaged in emergency damage control or has sustained casualties.

2. The planned maneuvers of ASPB's and monitors and possibly violent course changes by the ATC require positive fire control.

3. One alternate tactic for reacting to an ambush is for all boats in the killing zone to close and move toward the bank from which the heaviest fire comes. This maneuver limits the enemy on the opposite bank to a long-range fire with the danger of firing into their own positions. Fires massed on the shoreline just ahead of the evading watercraft can suppress the enemy fires on the near bank while the boats pass each ambush position.

(*b*) When an assault element lands, fires are coordinated to support the assault element and to deliver suppressive fire on the ambush forces. The assault element lands outside the ambush position, if possible, and attacks the flank of the ambush force. When the entire waterborne force is caught in the ambush area, the Army commander designates an element to assault the ambush position to relieve pressure on the movement unit. This as-

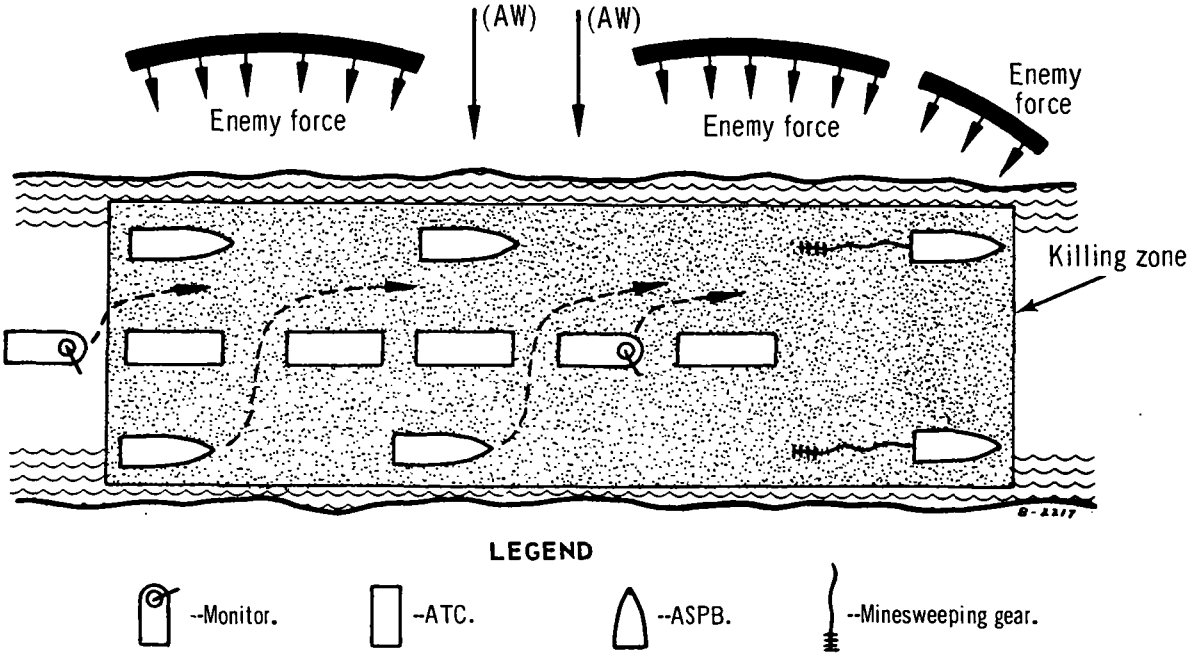


Figure 5–3. Reaction when an ambush force is suppressed and movement continues.

sault normally requires the landing of a second element on the flank to overrun the ambush position (fig. 5–4). Suppressive fires are employed against the opposite bank. The commander designates an element to assault the opposite bank if the enemy's initial attack is a ruse and the ambush force occupies positions on both sides of the waterway.

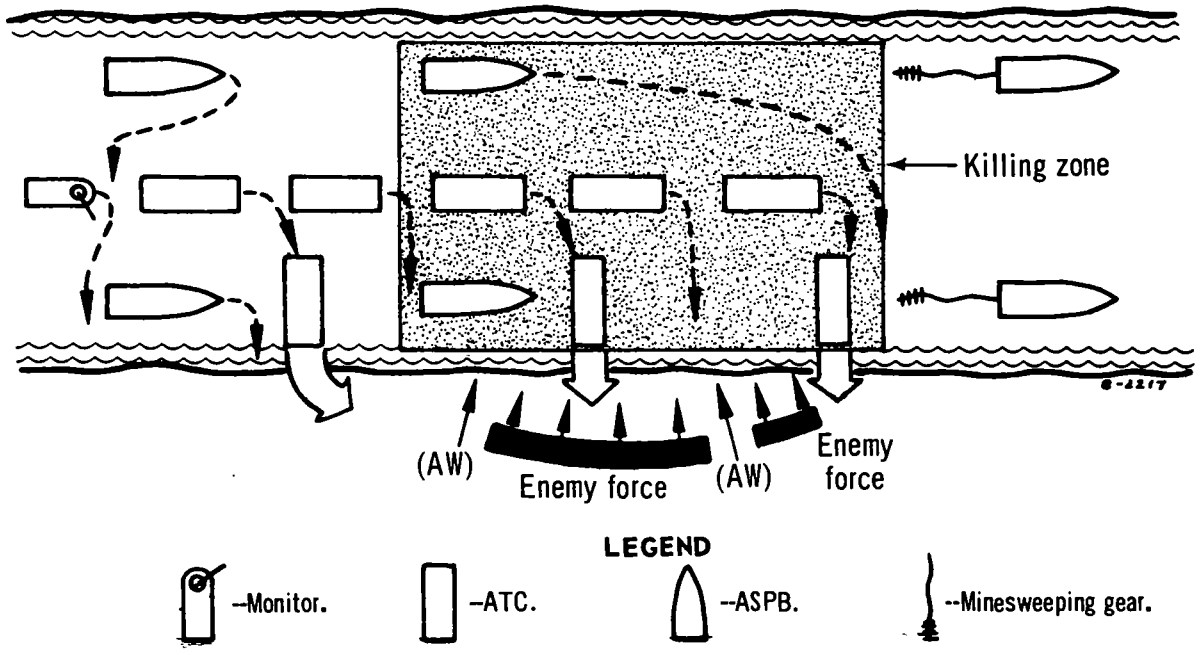


Figure 5–4. Reaction when troops land.

Section V. CLEARANCE OF WATER OBSTACLES

5–23. General

a. Navy elements clear navigable waterways of obstacles. Divisional engineer elements may assist in clearance. A planned water obstacle removal program is conducted throughout the riverine area.

b. Close coordination with host country officials is mandatory before the removal of any water obstacle. Dikes may be constructed as flood control measures.

5–24. Water Obstacles

Three basic types of water obstacles are—

a. The log, which is the most common. Crossed logs (frequently as small as 3 to 5 centimeters in diameter) may be used in waterways from 25 to 50 meters wide. Interwoven bamboo and vines strengthen the structure. In areas where the current flows in only one direction, debris, to include small trees, bushes, and foliage, accumulates on the upstream side.

b. The mud dike, which may be found in canals having a tidal current. This dike restricts the movement of military watercraft and may reduce the flow of tidal currents upstream from the dike.

c. The mud dike, 2 to 3 meters wide, laterally reinforced with logs on each side is used the least and is the hardest to remove.

5–25. Waterway Clearance

a. Log obstacles are usually removed by fastening heavy lines to the main structural members and by using watercraft as tractors to pull them out.

b. Mud dikes are usually removed by using either, explosive charges or a clamshell or dragline. The most common error in using explosives to remove mud dikes is failure to place the charges sufficiently deep in the dike. This error, wasteful of time and explosives, increases the difficulty of ultimate clearance.

c. The mud dike reinforced with logs cannot be removed with explosives alone. Logs

as large as telephone poles or reinforced concrete pillars may be used in constructing this type of obstacle. The logs on both sides of the dike are removed first by pulling them out with watercraft. Major pieces of debris are then removed from the dike, and explosives are used to complete the removal of the obstacle.

d. The stream usually requires widening or deepening after removal of water obstacles. Dredges may not be available; however, divisional engineers can mount a crane on organic rafts and use either a clamshell or dragline to complete the removal of the obstacle.

Section VI. SURVIVAL, EVASION, AND ESCAPE

5–26. General

a. This section outlines procedures and techniques for survival, evasion, and escape in a riverine environment.

b. Units, and particularly individuals, are susceptible to enemy actions that isolate them from friendly forces. The riverine environment and the problems in land navigation and traversing the area increase the difficulty of rejoining parent organizations.

c. Failure to survive in remote areas ot the riverine environment results more often from ignorance or inexperience than from enemy actions. Survival is difficult, even when the area is devoid of enemy troops. The weather and terrain provide the evader or escapee with both advantages and disadvantages. They key to survival is maintaining the will to live.

d. The material and procedures in FM 21–75, FM 21–76, FM 21–77, and FM 21–77A apply in the riverine environment.

e. Definitions of terms used in this section follow:

(1) *Survival*—Living through a period of hardship during evasion or imprisonment.

(2) *Evasion*—Action to prevent capture when separated from one's unit in a unfriendly area and to return to one's own unit. Evasion by infiltration is the most successful means of returning. Evasion by deception is difficult, particularly when facial features, language, and customs of the area are different.

(3) *Escape*—Action to get away from the enemy when captured. FM 21–77 and FM 21–77A outline escape procedures.

5–27. Equipment

Physical demands on the individual soldier operating in a riverine environment prevent his carrying nonessential equipment. Essentials include individual weapon with bayonet, ammunition, rations, water, survival kit, smoke grenades, and a signal (light source) device. Any shiny piece of metal or glass can substitute for the signal device. A piece of glass blackened on one side is better than plain glass. Imagination, ingenuity, and perceptiveness reveal materials common to the area, which the inidividual soldier can use for survival.

5–28. Rules for Evasion

The following rules assist an individual to evade capture and to survive in a riverine environment:

a. Be knowledgable of curfews imposed on the local populace. This knowledge assists in determining the best time to travel.

b. Be familiar with the terrain in the AO. Know how to use stars as an aide to land navigation at night.

c. Make maximum use of waterways for travel, using boats, logs, or other materials. Study the tides and use them to advantage. Dry thoroughly after getting wet.

d. Use large waterways for travel because the smaller the waterway, the greater the danger of detection.

e. Travel at night, when possible, to avoid moving when temperatures are high. This helps to reduce drinking water requirements and lessens the danger of being detected.

f. Always travel toward last known friendly dispositions.

g. Avoid exposure during the daylight.

h. Avoid people who cannot be positively identified as friendly.

i. Live off the land. As a general rule, food is plentiful.

j. Avoid making fires.

k. Be alert for search and rescue aircraft.

Use any available means to signal them.

l. Become familiar with insects, animals, and symptoms of disease common to the area. Recognizing symptoms of diseases assists in deciding whether to continue traveling or to stop to overcome the effects of diseases that may become serious.

5–29. Rules for Survival

a. Do not cut off uniform sleeves. Keep forearms covered to help to prevent cuts and infections and reduce the possibility of mosquito bites.

b. Learn to recognize the local foods that are edible. Pineapples, coconuts, bananas, other fruit, and fish are usually plentiful in most riverine areas. Peel all fruits before eating.

c. Boil or treat water before drinking, if possible. Use one water purification tablet per canteen when water is clear; otherwise, use two. Drink small amounts at a time to avoid stomach cramps.

d. Use insect repellants freely. Liberal use may prevent insect bites and reduce the possibility of contracting diseases prevalent in a riverine environment. The odor of insect repellants dissipates rapidly, and its detection by enemy forces has not been verified despite repeated attempts to substantiate this claim. Antimalaria tablets, included in individual survival kits, can prevent malaria when taken faithfully.

e. Treat snakes as if they are all poisonous; however, remember that snakes are a source of food.

f. Watch for leeches. They live in water and on most jungle undergrowth. Before entering streams, canals, or other waterways, tighten sleeve cuffs at the wrists and fasten the trouser cuffs outside boots. Apply insect repellant to uncovered parts of the body. If these measures fail, remove leeches carefully with insect repellant or heat (cigarette). Quick removal of leeches may leave the heads embedded and cause infection. Killing the leech with heat has the same effect as quick removal.

g. Clean and dry armpits, groin, and feet help prevent fungus infection. Use foot powder frequently.

h. Individuals in a riverine environment frequently suffer from the effects of heat exhaustion or heat stroke. FM 21–11 provides information on the symptoms and recommended treatment for these conditions.

CHAPTER 6
COMBAT SUPPORT

Section I. INTRODUCTION

6–1. General

Limited ground mobility in the riverine environment restricts certain aspects of combat support. Units may be widely dispersed, and environmental restrictions often prevent mutual support. Although support requirements are no greater than normal, immediate response is essential. The scarcity of dry land, which many units need to accomplish their mission, requires the commander to establish priorities for land use.

6–2. Sector Operations and Intelligence Coordination Center and Combat Support Coordination Center

A sector operations and intelligence coordination center (SOICC) (ch 1) coordinates operations and intelligence gathering within the political division where there aften are heavy concentrations of civilians and where land areas for combat support and combat service support functions are scarce. A combat support coordination center (CSCC) (ch 1) coordinates all combat support functions, primarily fire support agencies, for an operation and may be a subordinate element of the SOICC.

a. Representation in an SOICC includes Navy, Air Force, Army aviation, artillery, and psychological operations (PSYOP) personnel. Representatives or liaison personnel from host country, province, or district coordination centers and their U.S. advisors may participate in the SOICC. Additionally, the SOICC may provide liaison personnel to host country area or regional coordination centers.

b. The tactical headquarters of the coordinated operation—division, brigade, battalion, joint task force (JTF), or subordinate JTF—is represented in the SOICC.

Section II. FIRE SUPPORT

6–3. General

Continuous, flexible fire support is indispensable in riverine areas. Several factors make provision of this support difficult. These factors include inadequate survey control, either a lack of maps or inadequate maps, scarcity of dry land for artillery positions, scarcity of meteorological data, and curtailment of massing fires when fire direction is decentralized. Although normal fire support procedures apply, some modifications and innovations, particularly in the use of fire support from rivercraft, are necessary in riverine areas. Discussion of these modifications follows.

6–4. Rules for Engagement

A requirement to defeat enemy forces in densely populated areas with minimum loss of noncombatant's lives and property necessitates a thorough understanding of the rules for engagement. All personnel have to be aware of the implications associated with the use of long-range direct and indirect fires in a densely populated area. All fire support elements prepare to provide fires on short notice. Rules for engagement normally permit the use of indirect fire in populated areas only when the enemy's position has been positively located and identified. Liaison personnel from host

country forces and governmental agencies and their U.S. advisors provide guidance concerning the decision to engage suspected enemy targets. Accidental killing or injuring of friendly civilians is not conducive to the mission of gaining support for the host country government. Because of the danger of long-range ricochets, employment of .50-caliber machineguns or larger caliber weapons in a riverine environment is extremely restricted.

a. To provide for ease and speed of response to fire requests, the SOICC or CSCC designates free-fire areas for the entire area of operations (AO) or a large portion of the area. Through the SOICC, the riverine force attempts to identify enemy-controlled areas throughout the tactical area of responsibility (TAOR) or AO for ease in securing fire clearance for landing zone (LZ) preparation and objective preparation in an AO. Liaison teams, from the riverine force, assist in obtaining fire clearances from regional coordination centers. Because of the wide scope and transient nature of its operations, the riverine force commander may be compelled to divert officer's from their normal duties to augment authorized liaison teams. Delaying the request for clearances may prevent premature disclosure of scheduled operations. Deception plans may provide for submitting clearance requests for impact areas outside the AO and some fire missions in these areas may actually be fired.

b. Fire direction officers coordinate with local government officials and their U.S. advisors before firing harassing and interdiction (H&I) fires or firing artillery for training, calibration, or registration. When possible, requests for impact areas, free strike areas, rocket disposal areas, and target lists for H&I fires are submitted in advance to the U.S. advisor for his counterpart's approval. Desired leadtime enables these officials to make necessary arrangements with civilians in the impact area. The need to prevent disclosure of a prospective AO may delay coordination until the operation commences.

c. All personnel concerned with requesting or providing fire support must be intimately familiar with the rules for engagement established for the riverine area.

6–5. Fire Support Coordination

Current techniques and procedures for planning and coordinating fire support (FM 6–20–2) are valid for riverine operations. Detailed coordination and planning are necessary before and during operations because the forces of two or more countries may be involved. Population density and host country internal relationships may require other than normal procedures. Fire support coordination in this environment probably increases the use of fire coordination lines (FCL).

a. Impact areas for all supporting fires require coordination with the SOICC or CSCC.

b. U.S. advisors to host country agencies provide commanders information on territorial matters that may influence the operation or be influenced by it.

c. An example of the detailed coordination and planning necessary in riverine operations is the preparation of landing areas (LA) and landing sites assaulted by a waterborne force or LZ assaulted by an airmobile force. Close airstrikes begin the preparation shortly before the landings commence, followed immediately by the artillery preparation and the organic firepower of the watercraft or helicopters as the maneuver elements land.

d. At company, the commander coordinates his own fire support and integrates available fires with his scheme of maneuver or plan of defense. In addition to his organic weapons, he may have support from artillery, the battalion heavy mortar platoon, weapon helicoptier, high-performance aircraft, naval gunfire, and the direct and indirect fires of the river assault squadron (RAS). Forward observers (FO) from the direct support artillery battalion and battalion heavy mortar platoon, the forward air controller, and infrequently a naval gunfire spotter and an RAS liaison officer assist the company commander in coordinating fire support.

e. At battalion, the fire support coordination center (FSCC), either at the command post (CP), or on a command control boat (CCB), coordinates all fire support available to the battalion commander. Key personnel who normally operate in the FSCC are the fire support coordinator (FSCOORD) (liaison officer from the artillery battalion in direct

support of the brigade); the battalion heavy mortar platoon leader and, when appropriate, the S3 air; a tactical air control party (TACP) with an air liaison officer (ALO) and a forward air controller (FAC); a shore fire control party (SFCP) with a naval gunfire liaison officer (NGLO) and a naval gunfire spotter (NGFSPTR), when available and when naval gunfire is provided; a liaison officer from RAS; and liaison officers from host country and third country. When an airborne CP is employed, only FSCC personnel essential to the particular phase of the operation in progress accompany the commander. When only the FSCOORD accompanies the commander, he uses radio to coordinate with other elements of the FSCC.

f. At brigade, the FSCC at the CP either aboard the brigade APB, at the land base, or aboard a CCB coordinates all fire support available to the brigade commander. The direct support artillery battalion commander is the FSCOORD. Key personnel who normally operate in the FSCC are the FSCOORD or his assistant (the liaison officer from the direct support artillery battalion); the brigade assistant S3, air when appropriate; the brigade chemical officer; ALO from the TACP; NGLO from the SFCP; and RAS, host country, and third country liaison officers.

g. Division and higher commands establish either a fire support element (FSE) in the tactical operations center (TOC) or a CSCC.

6–6. Field Artillery

a. Consideration and Applicability. The following guidance is based on the employment of an infantry division artillery in a riverine environment. It is applicable to division artillery of other types of divisions and nondivisional artillery units operating in this environment.

b. General. Artillery units, employing normal procedures, provide fire support to all echelons of the riverine force. Independent fire direction by batteries is a normal procedure in riverine operations. Exploiting all means of mobility is a key factor in planning and conducting riverine artillery operations. Artillery tactics do not change; however, the techniques of artillery employment change to fit the existing situation and terrain. The doctrine, techniques, and procedures outlined in FM 6–20–1, FM 6–20–2, FM 6–40, and FM 6–140, and modified by this text apply to artillery operations in a riverine area.

(1) Artillery fire support must be available during movement of the maneuver elements. This may require emplacing artillery in firing positions prior to movement of the maneuver elements. The artillery movement requires security elements from the supported unit, as well as support from other artillery units and tactical air or Army aviation units.

(2) Artillery organization for combat is commensurate with the needs of the operation and the availability of artillery units. In riverine warfare an artillery battalion may support a maneuver battalion or artillery batteries, or platoons may support them independently. Scarcity of adequate position areas may prevent using the quantity and caliber of artillery indicated by enemy strength and area characteristics.

(3) Position areas are usually small and are located in unsafe areas.

(4) Artillery batteries prepare to use all available means of transport during any one operation.

(5) The primary mission of artillery is to support the operations; however, batteries may provide area support as a secondary mission. This secondary mission requires the immediate readiness of batteries to support host country forces within range.

(6) Lack of positions in defilade, lack of cover and concealment, and positioning in an unsafe area necessitate preparation for direct fire techniques and use of antipersonnel ammunition. The supported unit augments the artillery unit's local security elements.

(7) Artillery's lack of survey and meteorological data may prevent its delivering accurate fires without adjustment (registration). The division artillery meteorological section may employ two- or three-man teams equipped with visual siting instruments in support of each direct support battalion. These teams can provide wind direction and speed data up to the cloud cover and also surface temperature and humidity readings. Meteorological messages are necessary every 4 hours.

c. Positioning Artillery Units.

(1) When performing a base defense mission, the battery position facilitates—

(*a*) Defense of the base area and all watercraft. Positions selected for defense of base areas insure direct fire coverage on avenues of approach including canals and rivers. They also facilitate loading on watercraft for movement. Maneuver battalion radar sets assist in providing surveillance along the perimeter of the afloat- or land-base defense system.

(*b*) All-round defense of the battery position area.

(*c*) Resupply of ammunition.

(2) The scarcity of good dryland positions with dispersion laterally and in depth in riverine areas necessitates maximum use of canal banks, riverbanks, and roads when artillery is not firing from watercraft. Normally, artillery cannot collocate with the combat base; however, positioning to facilitate the provision of fire support to all units has first priority. When possible, batteries are positioned within range of one another to facilitate massing of fires and the firing of planned mutual defensive fires. Positions are selected to support the riverine force during movement to, within, and return from the AO.

d. Reconnaissance, Selection, and Occupation of Position.

(1) Watercraft provide normal artillery movement in the riverine environment. (Current manuals adequately cover procedures for land and air movement.) Artillery movement may precede maneuver force movement and, if possible, over a different route. Modifications of normal reconnaissance, selection, and occupation of position (RSOP) procedures and techniques for use in riverine environments follow:

(*a*) Before reconnaissance, host country artillery personnel and their U.S. advisors provide information about available position areas, recent enemy activity, available host country troop and artillery support during the reconnaissance, and the location of friendly forces and villages.

(*b*) When helicopters are available, they transport the reconnaissance party along the movement route, to the selected positions, and return along the withdrawal route. The reconnaissance party accompanying the battery/battalion commander will be smaller than normal when using helicopter transport.

(*c*) When the enemy situation permits, armored troop carriers (ATC) may perform reconnaissance. Normal reconnaissance party personnel are augmented for security. Standing operating procedures (SOP) cover fire support and naval escort during reconnaissance by boat.

(*d*) Since water movement is normal in a riverine area, the reconnaissance party, whether moving by boat or helicopter, includes the RAS commander supporting the unit's move. During reconnaissance of the position, the reconnaissance party selects boat anchorage or debarkation areas for the artillery unit.

(2) Each artillery unit prepares detailed SOP for conducting RSOP using all means of transport. The riverine force commander allocates boats—ATC, and landing craft, mechanized (LCM) (6), or LCM (8)—to artillery units for movement.

(3) During all movements, battery commanders/executive officers (XO) and boat commanders independently and continuously maintain an awareness of boat position and verify it with each other to insure accuracy of its location in preparation for an emergency occupation of a firing position. FDC personnel plot suspected targets and known locations from which to transfer firing data to assist the unit in providing fire support during the movement.

(4) Air and artillery support, air observers, and radio retransmission are SOP for all artillery movements. Naval elements, armed helicopters, other artillery, tactical air, and host country forces may provide support and route security on request.

(5) Buoy markers, attached to watercraft, assist underwater recovery of equipment when watercraft sink.

e. Defense of the Battery Position Area.

(1) Plans for defense of the firing position include closein defensive fires, coordinated with a mutually supporting battery or battalion, when possible. Positioning of artillery pieces provides for covering avenues of approach into the firing position with direct fire, using antipersonnel ammunition. Defen-

sive plans include the use of claymore mines, trip flares, handheld flares, radar, and seismic intrusion devices.

(2) Battalion/battery personnel can perform duties as security guards when the environment prevents their employment at their primary tasks.

(3) Searchlight sections and air defense artillery in a ground support role may augment organic weapons in the defense of the position.

(4) Available interpreters and host country military and security police can control and divert civilian traffic near the battery area. Coordination with host country officials and their U.S. advisors is necessary to accomplish this task.

(5) Adequate countersurveillance measures commensurate with the enemy surveillance and detection means, must be provided. Camouflage techniques are the minimum requirements to reduce vulnerability.

f. Observation, Fire Direction, Survey, and Ammunition.

(1) Increased emphasis on air observation is necessary in the riverine environment, particularly during all waterborne movements. A lack of commanding terrain necessitates air observation in the AO. The coordination of air observers with FO's on the ground insures the best artillery coverage, coordination, and surveillance of the area. The artillery headquarters battery observer and uncommitted liaison officers and firing battery observers may be used as air observers. Division artillery aircraft may be used to accomplish this mission, or the observer may ride with the airborne FAC. When trained in adjustment of indirect fire procedures, the FAC may perform this mission to augment the Army air observer. Air Force FAC and Army observer aircraft over the area are coordinated to provide continuous air observation of the area to detect fleeting enemy targets. Air observers become familiar with the AO prior to the operation to improve their effectiveness for both air and ground operations. Observers can become oriented with the AO by flying with Army and Air Force visual reconnaissance (VR) pilots during regularly scheduled flights, thus preventing an increase in air activity over the AO. VR pilots identify friendly villages and likely target areas to these air observers.

(2) The RAS has no organic observers to adjust the gunfire support that it provides during operations; therefore, artillery FO adjust RAS fires as well as artillery fires. FO's require training in adjusting RAS fire. SOP cover procedures, frequencies, and circuits for obtaining and adjusting RAS fire.

(3) Fire direction and fire planning follow conventional methods. Battalion controls fire direction when possible, however, widely dispersed operations and special task assignments may dictate fire control and direction by battery. The application of special corrections to firing data for an open or closed sheaf, as requested by observers, is SOP. The battery position may be only 90 meters wide with the pieces in line, and an open sheaf is necessary for the rounds to land in the impact area giving the effect of a normal sheaf of weapons in an ideal position. A converged sheaf may be desirable when the maneuver element's disposition is circular; and when contact occurs, friendly and enemy elements may be within 30 to 50 meters of each other. FDC personnel and FO's require proficiency in procedures and techniques of firing destruction missions.

(4) FDC personnel and FO's require knowledge of the actions of various fuze/projectile combinations against the common types of targets found in the AO.

(*a*) *Smoke.* In addition to providing a screen to conceal friendly movements, smoke rounds used for adjustment near populated areas reduce physical damage and injury to noncombatants.

(*b*) *VT fuze.* The variable time (VT) fuze is normally more effective than fuze quick against personnel in this environment. Fuze VT may prove particularly effective for H&I missions, along trails and small waterways, for fires to block the enemy in tree lines until the maneuver elements can be inserted, and on the rare occasions when the enemy is caught in the open.

(*c*) *Concrete-piercing and delay fuzes.* The enemy normally fights only when he so desires and then from strongly fortified positions. Fuze VT is ineffective in these instances because the positions may have thick, baked

mud-brick walls with logs for overhead cover. Artillery firing at fortifications requires the use of concrete-piercing fuzes or delay fuzes and may possibly require firing destruction missions.

(5) A secondary mission to provide fire support to friendly paramilitary forces requires the mutual exchange of call signs and radio frequencies with U.S. advisors in the area. The request and clearance for the fire mission come through the responsible local government official (probably district chief) before the firing starts. U.S. advisors to local governmental officials coordinate the requests. An area support mission requires an aircraft and observer on ground alert to adjust fire because paramilitary forces at villages and hamlets normally are not qualified to adjust fire. Adjustments must be made cautiously to prevent damage or injury to friendly elements.

(6) The division artillery's distance measuring equipment (DME) can provide survey data to firing points if any survey control points (SCP) are available as a starting point and the unit is in the AO long enough. Liaison with U.S. advisors to host country governmental officials may reveal SCP as carefully surveyed public buildings. The flat riverine terrain is excellent for using this equipment. Survey parties, augmented with security forces and using boats or helicopters, can establish SCP's. Lack of survey control probably will necessitate the use of observed firing charts or map firing charts. Small teams of battalion survey personnel at battery can establish common direction by simultaneous astronomical observation to assist in massing fires.

(7) Methods of employing the counter-mortar radar include—

(*a*) Mounting aboard the brigade personnel barracks ship (APB).

(*b*) Transporting forward to a selected ground position in the AO.

(*c*) Emplacing on a tower at the land base.

6–7. Barge-Mounted Artillery

Experience in the Mekong Delta area has shown that barge-mounted artillery is one of the best methods of providing artillery fire support during riverine operations. LCM (8) are employed to tow barges transporting two 105-mm howitzers, ammunition, and gun crews into position to support operations (fig. 6–1). Construction of these barges permits the howitzers to fire from the barge with negligible shifting as a result of recoil, even when fired at low elevations. LCM (8)'s are used to displace the barges to firing positions. Additional LCM (8) provide waterborne facilities for the artillery battalion CP, FDC, and aid station; battery CP and FDC; ammunition resupply; and damage control. Other watercraft at the position normally consist of 155-mm howitzers mounted in LCM (8), the brigade CCB, a helicopter (HELO) barge, and a refueler (fig. 6–2).

a. Firing positions for barge-mounted artillery are readily available, and occupation of the positions presents few problems. Desirable qualities for position areas are—

(1) Steep banks below the surface of the water to decrease listing as the tide fluctuates.

(2) Wide expanse of water to front or rear to reduce the danger of handgrenade and small-arms attack and provide clear fields of fire for antipersonnel ammunition fired in defense of the position.

(3) Limited avenues of approach over land. Islands and small peninsulas are desirable, but frequently have undesirable sloping banks.

(4) Avoidance of areas of strong current, when possible, to reduce anchorage problems.

b. Reconnaissance, selection, and occupation of position by barge-mounted artillery include the following:

(1) Two ATC mine-sweeping craft precede the barge-mounted battery while one ATC, transporting infantry personnel, follows it.

(2) The riverine force commander normally places one infantry platoon under the operational control of each artillery battery commander to provide that battery local security. This platoon secures artillery positions prior to the barge's securing to the shore. The aiming circle is set up concurrently with anchoring the barges, and the pieces are quickly laid parallel.

(3) Artillery pieces normally remain on barges because the barges provide all necessities required for the artillery unit to supply fire support. The barges move to a new posi-

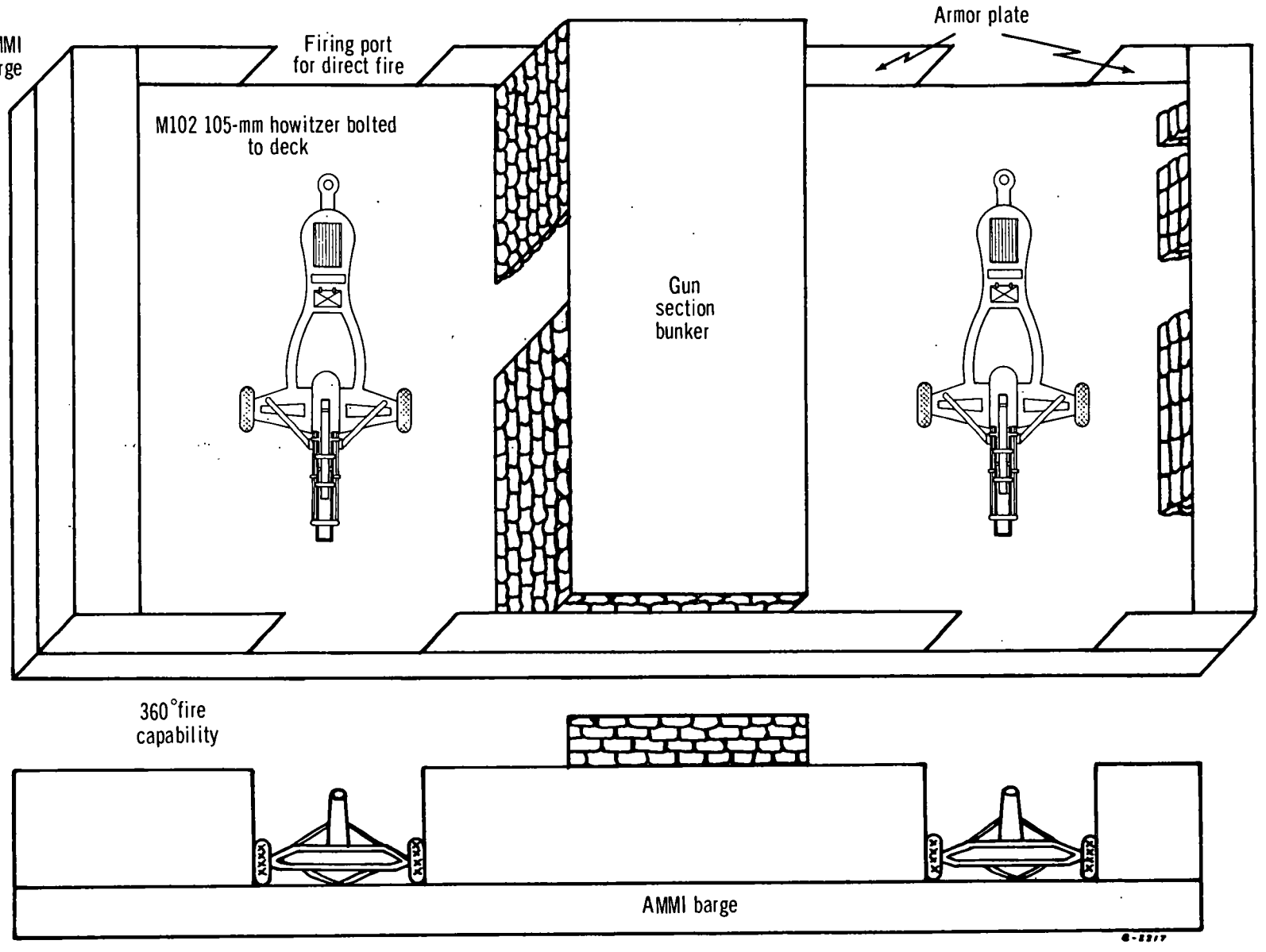
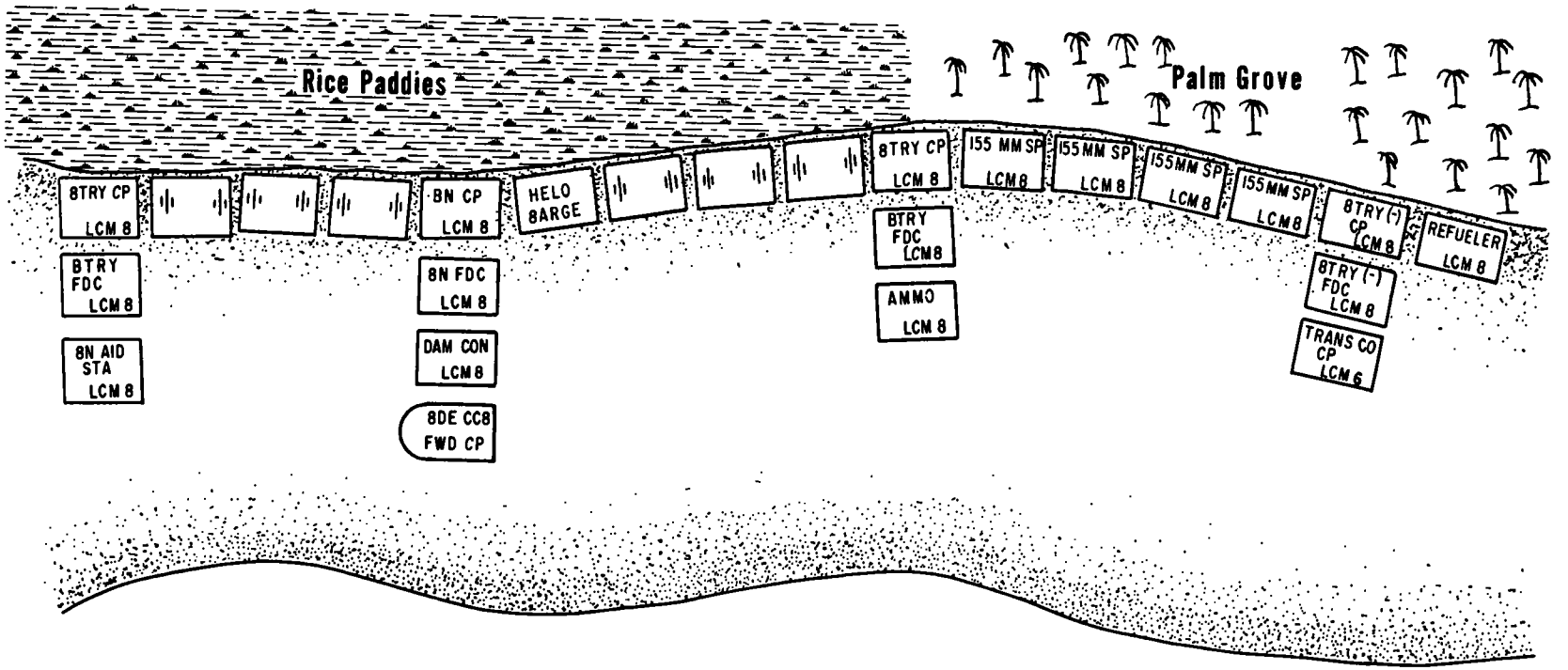


Figure 6–1. 105-mm howitzer artillery barge.



NOTES: HELO barge provides helicopter pad for 2 UH -1B or OH-23. (Arty bn normally has 1 OH-23 at all times for arty LO. Barge has 1,500 gallons of JP-4 and 500 gallons of AVGAS for emergency refueling.)

Ammo LCM(8) can carry 2,000 rounds of 105 mm (or combination 105 mm/155 mm).

Refueler LCM(8) carries 1,200-gallon tank truck for LCM(8) refueling.

In this example, the remaining 105 mm btry and 1 plat of the 155 mm btry are employed elsewhere.

Figure 6–2. Barge-mounted artillery position.

tion when they can no longer provide fire support from the original position.

c. Requirements for the security of barge-mounted artillery battalion/battery follow:

(1) The defense of the position normally requires two ATC and one monitor, with emphasis on patrolling the waterways and providing flanking fires with 7.62-mm machineguns and 20-mm and 40-mm cannon.

(2) Concussion grenades and ¼-pound blocks of TNT, dropped in the waterway at random times and locations, deter attacks by swimmers.

6–8. The 155-mm, Self-Propelled Howitzer Mounted in the LCM(8)

The 155-mm, self-propelled (SP) howitzer can fire from the LCM (8) in the stream or anchored ashore. The employment of the howitzer in this manner provides medium artillery reinforcing and general support fire capability with the force in the AO. The 155-mm SP howitzer maintains a 6,400 mil traverse capability when aboard the LCM (8) and offers armor protection for the crew. The 155-mm SP—LCM (8) combination does not require additional boat space for prime movers.

6–9. Airmobile Positioning of Artillery

Helicopters may transport artillery units to firing positions within the AO. Helicopters may position a portable aluminum platform for firing the 105-mm howitzer. This platform permits artillery to fire from rice paddies and soft muddy areas from which accurate artillery fires would otherwise be impossible. The platform consists of a 22-foot square aluminum structure with a plywood deck and adjustable legs at the corners. The platform is air-transportable by helicopter as an external load. The artillery unit may occupy normal dryland positions. Regardless of the position occupied, planners consider the following factors during planning.

a. Displacement by helicopter is a method of deployment; however, temperature, air density, and altitude may limit it and necessitate disassembling howitzers into suitable loads by weight. Some vehicles for surface movement in the AO require deployment by airmobile means. Helicopter deployment would—

(1) Reduce the time that a battery is out of action.

(2) Circumvent the problem of exiting canals and rivers.

(3) Increase the element of surprise. The speed of deployment increases the element of surprise; however, this activity may alert the enemy to an impending operation.

(4) Prevent the possibility of ambush while en route.

(5) Make accessible those position areas that are normally inaccessible from waterways or roads.

b. Airmobile deployment may make the battery an integral defense element of the combat base by positioning it in the combat base area with naval and infantry elements. Such positioning facilitates defense of the howitzers.

6–10. Artillery Mounted in or Transported by ATC or LCM(6)

a. A 105-mm howitzer can fire from a beached ATC or LCM (6), using the techniques described in this paragraph.

(1) Boat cargo capacities, number of boats available, and weight of cargo determine the amount of ammunition carried into the AO with the artillery pieces. The ammunition load includes high-explosive (HE), illumination, white phophorous (WP), smoke, and antipersonnel ammunition.

(2) Timbers and sandbags placed in the well of the ATC brace the howitzer and trail spades. The piece is laid over the lowered bow ramp. Additional timbers placed behind the trail spades transfer the recoil to the bulkhead and prevent shifting of the ammunition (fig. 6–3).

(3) A combination of winches, cables, and land anchors holds the ATC in position against the shore. Holding the boat in position against the shore and preventing the current from broaching the boat require the attachment of two lines to the stern and two to the bow.

(4) Fire direction at battery may take place from inside a prime mover or aboard a watercraft. The artillery units may not be allocated sufficient boats to transport vehicles to the battery area for use as an FDC. When vehicles are not available, portable radios replace vehicular radios in the FDC. Wire com-

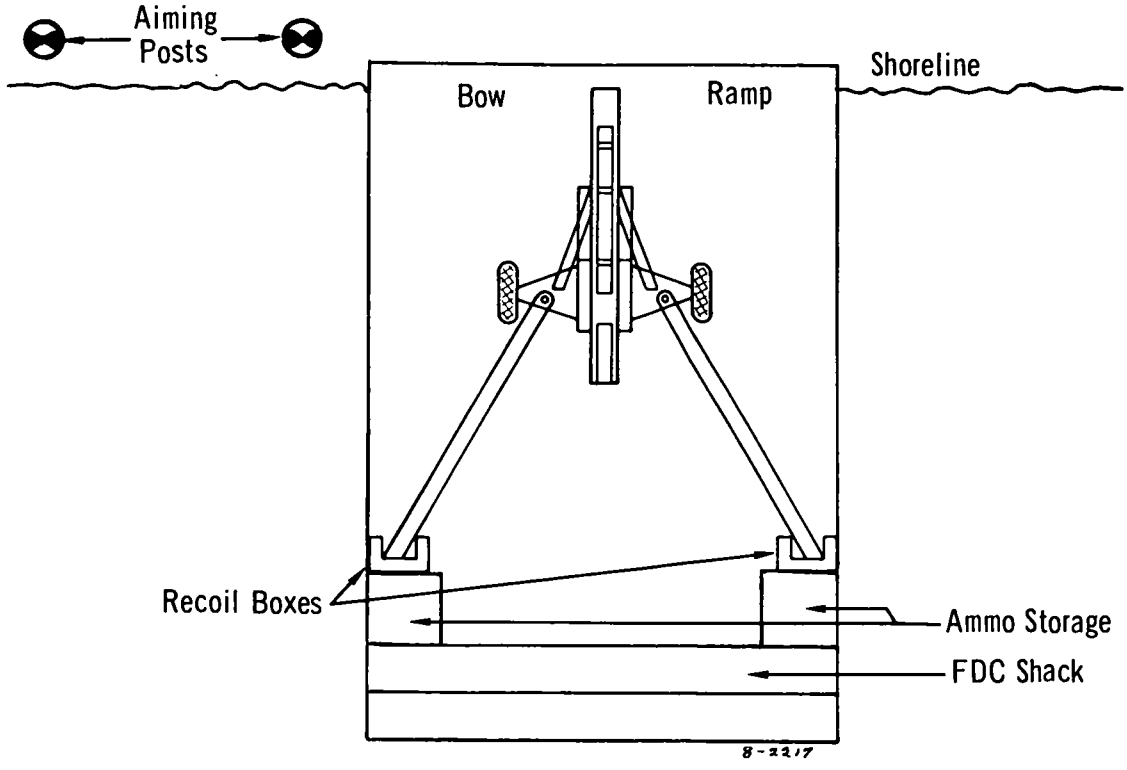


Figure 6–3. Firing of 105-mm howitzer from an ATC or LCM(6).

munications between ATC transmit fire commands. Standard fire direction procedures apply.

(5) Both high- and low-angle fires are possible; however, low-angle fires place more strain on the anchor system. Howitzers fire along the centerline of the ATC and to the sides within normal traverse limits.

b. Prime movers and howitzers back into the cargo compartment during loading. Loading a 2½-ton truck prime mover and a 105-mm howitzer aboard a single ATC or an LCM(6) requires uncoupling the howitzer and spreading the trails.

c. Successful occupation of land positions in a riverine operation using water transport depends on the unit's ability to traverse the canal bank or riverbank. The elimination of some prime movers from the movement and substitution of additional ammunition might be a consideration if boats are not available to carry sufficient ammunition forward on initial occupation. Ammunition resupply is by water or helicopter.

(1) Reconnaissance of the route and selected position provides the following information:

(*a*) Effects of the tide and width of the canal at debarkation time.

(*b*) Riverbank or canal-bank obstacles.

(*c*) Selected points of egress and alternates.

(*d*) Terrain adjacent to and inland from point of egress.

(*e*) Suspected enemy areas and likely ambush sites along route and around planned position.

(2) Frequently units will occupy unprepared positions. To facilitate rapid occupation, battery personnel (less howitzer sections, but possibly augmented with personnel from battalion) form six security and engineer teams. These teams (one per section) clear the canal bank of natural and manmade obstacles, assist in debarking and positioning the howitzers, and assist in providing security. Batteries prepare for action by piece, organizing the position as the situation permits. The following techniques are employed in the hasty occupation and preparation of position:

(*a*) Prior preparation of points of egress when possible. Chain saws assist in clearing trees and undergrowth from egress points and position areas. Beach matting, class 30 assault trackway, pierced steel plank, or T–10 membrane provide a stable surface condition for use by the prime movers in debarking the artillery pieces.

(*b*) Use of winches, blocks and tackle, and Danforth anchors to help prime movers and howitzers exit the canal.

(*c*) Use of the collimator, infinity aiming reference, to eliminate the need for a stable base for aiming posts at 50 and 100 meters from the piece.

(*d*) Use of helicopters to shuttle artillery pieces from boat to position areas.

(3) When the M113 armored personnel carrier (APC) is used as a prime mover, additional watercraft may be necessary to transport the piece and prime mover because the M113 weighs almost twice as much as the 2½-ton truck. Studies of performance of currently available vehicles operating in the riverine environment indicate that the M113 performed better than all wheeled vehicles and most amphibians. Advantages and disadvantages of using the M113 versus the 2½-ton truck follow:

(*a*) *Advantages.* The M113—

1. Is more maneuverable.

2. Climbs canal banks better.

3. Traverses paddies and mud areas better.

4. Provides crew protection against small-arms fire and shrapnel and increases available firepower.

5. Requires less space in the watercraft cargo compartment because it is shorter.

6. Crosses dikes and levees better.

(*b*) *Disadvantages.* The M113—

1. Has increased weight.

2. Requires increased maintenance.

(4) Dual front wheels installed on 2½-ton trucks provide the capstan part of a capstan and anchor system to assist in climbing riverbanks and canal banks (app D).

6–11. Transporting and Firing Artillery From LARC's

The lighter, amphibious, resupply, cargo (LARC) can transport a variety of artillery pieces within weight and space limitations of the vehicle. The LARC family consists of the LARC–V (5-ton capacity), LARC–XV (15-ton capacity), and the LARC–LX (60-ton capacity). The LARC does not have good mobility in some types of riverine terrain; however, it does have good handling characteristics in the water. Artillery can fire from the LARC with equal or better firing capabilities than when the same piece fires from ATC or LCM(6). The main advantage accruing from this combination is the amphibian characteristics of the LARC, which allows the howitzer to fire while in the stream, during exits from the waterway, and after occupation of the firing position—all while remaining aboard the LARC.

6–12. River Assault Squadron Fire

The RAS provides direct fire with 40-mm guns, 20-mm cannons, M79 grenade launchers, and .50-caliber and 7.62-mm machineguns. The squadron provides indirect fire with 81-mm mortars. RAS fires require close coordination to insure maximum support for the scheme of maneuver.

a. Direct Fire. Boats providing direct fire to a supported unit for one or more phases of an operation are normally in direct support. These weapons augment infantry heavy weapons by overhead fire, when possible, and fire to the flanks and through gaps in friendly lines. The use of the .50-caliber machinegun and other heavy direct fireweapons are restricted in relatively flat terrain because of the danger of ricochets.

b. Indirect Fire. Monitors and assault support patrol boats (ASPB) provide indirect fire support for the water movement and the scheme of maneuver after the assault landing. These boats provide fire support independently or in groups. Each one can process firing data independently. When grouped, they constitute a mortar battery in a position area on the waterway. One of the boats can provide fire commands for all others in the position area. Because monitors and ASPB's also perform minesweeping, waterway patrolling, and fire support missions during movement, their employment in an indirect fire support role depends on the commander's priorities. The RAS liaison officer and the FSCOORD recommends

employment of indirect TAS fire, based on the commander's guidance. The normal mission assigned to the RAS indirect fire support boats is reinforcing the direct support artillery battalion with short-range, indirect fires.

c. Observation and communications. The RAS cannot provide observers to adjust indirect fires. Normally, the artillery FO with the maneuver unit observes and adjusts RAS indirect fire. The artillery FO sends corrections directly to the boats, or through the RAS liaison officer.

6–13. Close Air Support

a. General. Close air support (CAS) for units operating in a riverine environment follows current doctrine, principles, and in-country procedures. The U.S. Air Force, U.S. Navy, host country, and/or U.S. Marine Corps may provide CAS.

b. Operations and Considerations. The riverine force uses air/ground procedures that are standard within the geographic area. Tactical air control parties (TACP) are provided at battalion, brigade, and division. The direct air support center (DASC) for the geographic area in which the riverine force conducts operations provides tactical air support. FM 61–100 contains details for requesting air support. When controlling tactical airstrikes, FAC are airborne as much as possible. Unique features and requirements of CAS in riverine operations follow:

(1) Effective CAS requires marking friendly elements to insure identification. Standard marking procedures used throughout the area are signals displayed using panels, colored smoke grenades, flares, and lights.

(2) Grid coordinates are necessary when submitting requests for tactical air support. Waterway intersections and river bends used as reference points assist in orienting the pilot. A sharp contrast between land and water exists during the dry season, but may not exist during the rainy season. The pilot cannot depend on this contrast to provide positive orientation under marginal visibility conditions.

6–14. Armed Helicopter Support

Most UH–1 helicopters in an infantry division are armed with two 7.62-mm machineguns mounted as door guns. The general support company, aviation battalion, has one platoon of helicopter gunships armed with combinations of machineguns, rockets, and grenade launchers. Door machineguns are primarily for self-defense; but machinegun. pods, rockets, and grenade launchers provide a capability to seek and attack the enemy. Although all helicopters with armament are called armed helicopters, helicopter gunships possess an attack capability and provide fire support to maneuver elements. Gunships escort utility helicopters in airmobile operations and also escort and provide armed reconnaissance and flank security for waterborne movements. Aviation elements available to riverine units can extend the range of fire support available to the ground commander during landings and debarkations, and movement to and from an AO. Gunships locate, illuminate, and destroy enemy forces during night operations in conjunction with radar- and searchlight-equipped aircraft. Gunships fires do not replace other types of supporting fires, but complement them. Positive identification of friendly elements is necessary before gunships provide fire support. Gunships may be under brigade control or further attached to subordinate elements of the riverine force. A gunship platoon is normally divided into a light fire team of two aircraft and a heavy fire team of three aircraft. This organization permits one section to remain airborne while the other refuels, thereby providing continuous surveillance and readily available fire support over the battle area. The FSCC must be informed of any request for aerial fire support to insure that neither the gunships nor artillery interfere with each other. Figure 6–4 shows the channels for requesting this type of fire support.

6–15. Naval Gunfire

a. General. Extensive mudflats and sandbars, which extend for several kilometers into the sea, may prevent large naval ships from providing naval gunfire support to riverine operations. Destroyers or smaller inshore fire support ships may be able to navigate the principal rivers during seasonal floods or peak tidal stages and provide gunfire support. When this support is available, procedures outlined in FM 31–11, FM 31–12, and FM 61–100 apply.

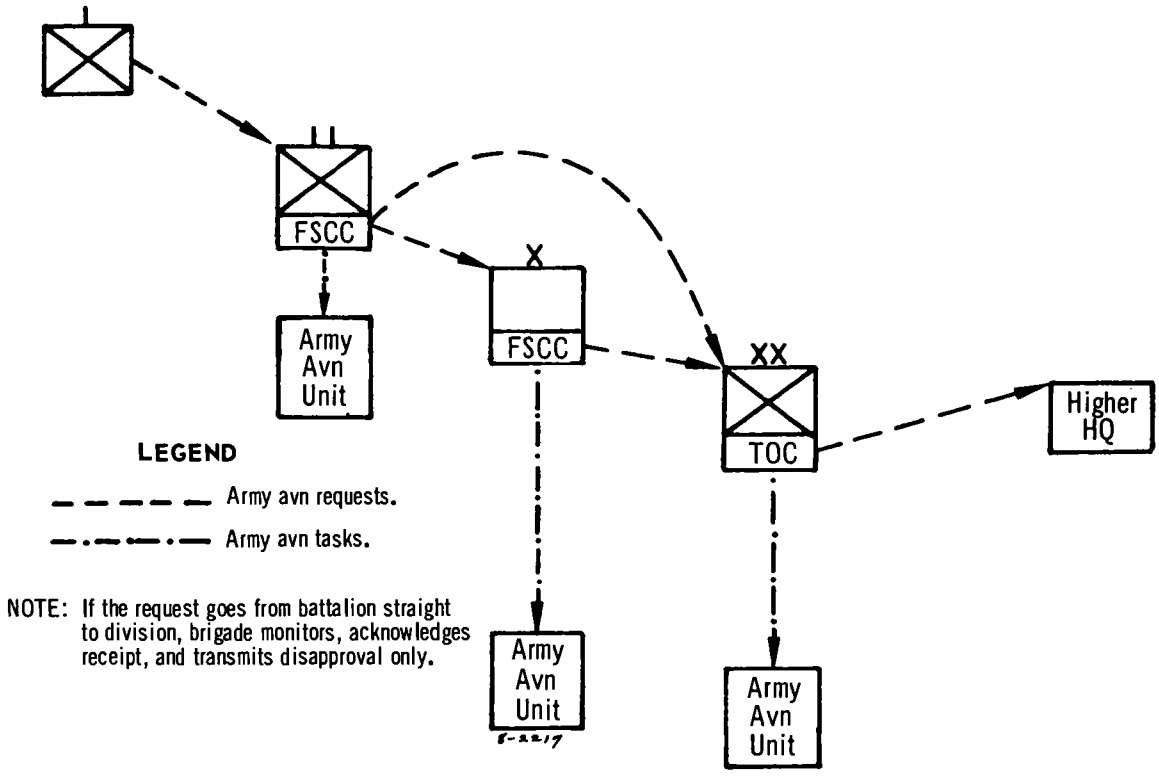
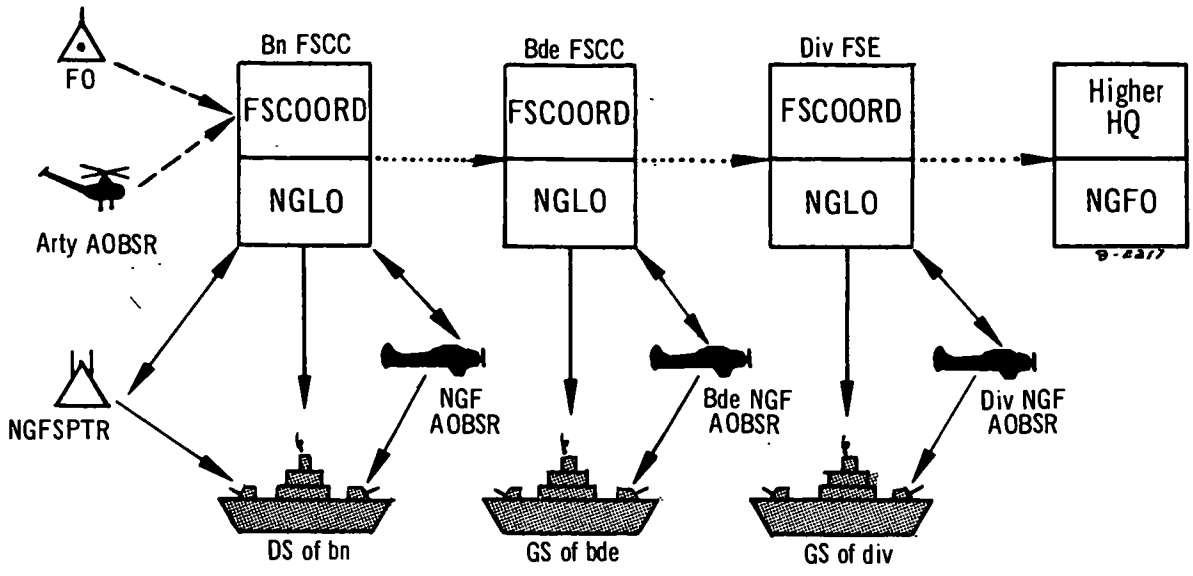


Figure 6–4. Air fire request channels.

b. Organization. The command echelon that controls and employs naval gunfire includes special staff representation for liaison and naval gunfire support. Personnel are available for liaison and control of naval gunfire at every level from the maneuver battalion to the highest echelon present. Air and naval gunfire liaison company (ANGLICO) personnel may be attached to the host country's area headquarters or at U.S. division and above. The duties of naval gunfire personnel include planning, providing information regarding gunfire support situations and capabilities, coordinating with other supporting arms, and supervising naval gunfire support. The naval gunfire officer serves as a member of the FSCC. At battalion, the SFCP consists of an NGLO and a naval gunfire spotting team commanded by an NGF-SPTR. This party controls and adjusts naval fires. They may be assigned to the maneuver battalions when naval elements provide gunfire support.

c. Observation and Communications. The SFCP normally provided a maneuver battalion observe and adjust naval gunfire. Direct support ships are in direct support of a specific unit, normally a battalion; and general support ships are placed in general support of a specific unit, normally brigade or larger. The direct support ship may have a radio set capable of entering the artillery fire direction net. If not, the fire request is transmitted to the direct support ship via the naval gunfire liaison officer at the maneuver battalion/brigade headquarters. If aircraft are not available to the naval spotting team, communication arrangements will be made to enable an artillery observer to observe and adjust naval gunfire. Figure 6–5 shows naval gunfire request channels.



NOTE: NGLO/NGFO will monitor and coordinate all calls for fire from air and ground NGFSPTR.

Figure 6–5. Naval gunfire request channels.

Section III. ENGINEER

6–16. General

Engineer support is essential in a riverine environment with restricted lines of communications (LOC); frequent obstacles and barriers; and a requirement for many rafts, boats, and temporary bridges. In a riverine environment, the engineer battalion's taks are more diverse than in a conventional environment. Normally, engineer units operate under centralized control when the situation permits. As units disperse and as support requirements increase, decentralization of engineer activities becomes necessary. The engineer commander prepares to accomplish his mission with little or no heavy equipment. Classification of local bridges may determine the equipment that supports operations. Storage space for engineer equipment and construction material is limited.

6–17. Special Requirements of Riverine Operations

Commanders modify engineer operations in a riverine environment to accomplish special requirements:

a. Construction and maintenance support to keep the limited and vulnerable LOC open. This mission may require construction of temporary bridges and ferries.

b. Production of sufficient quantities of potable water and construction of adequate storage and entrapment facilities for it.

c. Technical advice in the construction of barriers, obstacles, and berms in the land and afloat base areas.

d. Collection of engineer intelligence. This mission includes maintenance of liaison with

host country engineer units to assist in collection of engineer intelligence.

e. Preparation of landing sites on riverbanks to facilitate exit from the waterway. Organic engineer raft components transport heavy equipment and supplies across rivers, streams, and canals.

f. Preparation of helicopter landing sites on land and floating helicopter landing pads on mobile assault rafts.

g. Demolition support to deny, destroy, or close enemy caves, tunnels, and bunkers.

h. Installation or removal of mines and boobytraps. Engineer teams train supported units to detect and remove mines and boobytraps. These teams accompany land convoys to assist in mine clearance. Engineer teams may also assist in the clearance of naval-type mines from navigable waterways. However, naval explosive ordnance disposal personnel train these engineer teams before they are assigned this mission.

i. Detection of enemy arms and munition caches.

j. Construction of protective storage and shelter facilities that unusual drainage and moisture problems necessitate.

k. Production of map substitutes requiring updated imagery because waterways change constantly and cannot be mapped accurately. Making gridded air mosaics available to ground, air, and naval elements assists in ground orientation.

6–18. Intelligence and Reconnaissance Support

The criticality of terrain intelligence and route reconnaissance in a riverine area places unusually heavy demands on engineer reconnaissance elements. Air and boat reconnaissance also can produce significant intelligence information. Army engineers coordinate with the Navy on these surveys and assist the Navy in buoying channels and other activities necessary to aid navigation. To assist in maintaining control of the waterways, army engineer units must—

a. Determine Waterway Characteristics. Reliable information of the characteristics of waterways is necessary to their proper use. This information must be gathered continuously because waterway characteristics change constantly with the tides and season. Engineer units require instruction in practical techniques of collecting this type of information. Necessary information concerning waterways includes—

(1) Width, depth, and bottom characteristics of waterways.

(2) Velocity and nature of current and tidal effects.

(3) Height, slope, and condition of banks.

(4) Location of obstacles and potential ambush sites.

(5) Location and gradient of possible crossing sites.

(6) High- and low-water underbridge clearance and clearance between piers of bridges.

b. Reconnoiter Land Areas Contiguous to Waterways. Engineers surveying waterway characteristics also survey contiguous land areas for type and condition of roads, approaches to waterways, and village locations.

c. Augment the Organic Topographic Capability. Expanded engineer intelligence operations require maximum use of battalion intelligence sections and augmentation of topographic personnel. The attachment of other intelligence personnel to engineer units and the employment of local civilians provide the capability to—

(1) Use indigenous guides and interpreters.

(2) Maintain and update maps, charts, and air mosaics.

(3) Maintain and disseminate waterway data, buoy channels, and identify all waterways with legible signs. Street names are a source of identification.

6–19. Potable Water

a. Water Sources. Because a delta-type riverine area is close to the sea, its rivers and streams are tidal and much of the water is saline and unfit to drink. There are five ways to obtain an adequate supply of potable water:

(1) *Wells.* Although environmental characteristics make digging deep wells difficult, every possible site is investigated. Seepage wells are possible in some locations; and adequate, nearby storage facilities are necessary. The type of storage facility—high tower, concrete storage area, or plastic envelopes—de-

pends on the time that the wells probably will be used. Engineer cellular team GB, well drilling (TOE 5–520), can drill and develop wells to supply water to users at the wellhead. Well water requires testing and treatment if contaminated.

(2) *Entrapment of rainwater.* During the rainy season the heavy rainfall in delta-type environments warrants entrapping and storing as much rainwater as possible. At riverine land bases, storage facilities should provide each man 5 gallons of water a day. Rainwater must be tested and, if contaminated, must be treated.

(3) *Engineer water supply points.* The divisional engineer battalion can operate five water points to produce potable water for the division. The engineer combat battalion (army or corps) has a similar capability. Engineer cellular water purification teams can produce varying amounts of potable water. A water supply point located at a seepage well produces water efficiently.

(4) *Conversion of saline water to potable water.* Saline water, although not potable, is good for washing, sanitation facilities, and bathing. When bathing, troops prevent nonpotable water from entering their mouths. Both the Navy and the Army can convert saline water to potable water.

(*a*) The distillation systems of the ships in the Navy support squadron can convert saline water to potable water. Each APB can distill 40,000 gallons of potable water a day and can store a 4- or 5-day supply. The APL can distill 24,000 gallons a day and can store 250,000 gallons. In an emergency, a ship can replenish water supplies at land-base facilities. The auxiliary and expedient distillation equipment discussed in TM 5–700 supplements the ships' distilling capabilities.

(*b*) Team GK, water distillation (Draft TOE 5–520), can produce 6,000 gallons of potable water from sea or brackish water and can store 3,000 gallons a day. The water point teams of the divisional engineer battalions, the engineer combat battalions, or the water purification teams of the TOE 5–500-series can operate the thermocompression-type equipment required to convert saline water to potable water. Saline water conversion units can be mounted on watercraft, with storage facilities, to provide mobile, potable water production and distribution points.

(5) *Truck or water-barge importation of water.* This method is the least desirable for obtaining potable water because of the additional equipment required.

b. Supply of U.S. and Friendly Forces.

(1) Potable water supply storage is critical. A ship may fill a land-base water storage facility initially; however, after adequate storage and entrapment facilities have been constructed, a ship replenishes these supplies only in emergencies.

(2) Water supply points are not normally established at wells that are a primary source of water for civilians. Close coordination with local officials insures an adequate supply of water to friendly forces and the denial of potable water to enemy forces.

c. Denial to Enemy Forces. Enemy forces depend primarily on the entrapment of rain and boat importation of water for their supply. Eliminating stored water or adding chemicals whose odor or taste makes the water unpalatable are means of denial.

Section IV. COMMUNICATIONS

6–20. General

This section provides information on those aspects of communications peculiar to the employment of maneuver elements on afloat bases and land bases, during waterborne movement, assault landings, and subsequent operations. Established communication procedures and principles in current field manuals apply in a riverine area. This operational environment, which places additional demands on the resources of the division signal battalion and the communications platoons organic to the brigade and maneuver battalion, requires certain techniques not normally used and may require augmentation of both personnel and equipment. Emphasis is on required communication during all phases of troop deployments—waterborne, overland, airmobile, and airborne operations. Communication considerations applicable to riverine operations are—

a. The requirement for flexible communication support for brigades and battalions operating in a larger than normal area.

b. The requirement for increasing the brigade's communication capability and for organizing a self-contained, area-type communications system within the division area system.

c. Reliance on portable radio equipment by maneuver battalions after landing. This reduces the communications personnel requirements of battalions, under normal circumstances.

d. The requirement for extensive signal planning and coordination with higher, adjacent, lower, and supporting units and with U.S. advisory teams, host country, and other Free World military forces. Division and brigade staffs are the primary communication planners. This planning includes the continual evaluation of very high-frequency—frequency modulated (VHF–FM) and high-frequency—single-side band (HF–SSB) radio teams provided by the division signal battalion to support offensive operations.

e. Knowledge of naval communications organization and network structure. This requires knowledge of and qualification in the operation of Navy-type radio equipment installed aboard self-propelled barracks ships (APB's), barracks ships (nonself-propelled) (APL), and CCB's for use by embarked Army troops. The limited flexibility of installed fixed-plant type of wire communications aboard APB's and APL's requires alteration of normal procedures.

f. Thorough knowledge of the location and capabilities of area signal centers established by higher echelons in the riverine area. These centers provide multichannel radio-relay communication links and retransmission stations when organic capabilities are overcommitted or require augmentation. The afloat-based riverine force completely depends on radio for communications with units or headquarters outside the base area.

g. Increased maintenance and waterproofing requirements for all communication equipment.

h. Use of both rotary- and fixed-wing aircraft for radio relay, particularly during movements.

i. Communication security should be emphasized during all phases of the operation to preclude premature disclosure of operations.

6–21. Type of Riverine Force Communications

From the Army standpoint, the type of riverine force considered for communication planning is a brigade with from two to four battalions.

a. Afloat Bases. The afloat base consists of a brigade APB; battalion APB's or APL's; CCB's; and associated supply, maintenance, and hospital ships. The CCB serves as a forward CP with one required for brigade, each maneuver battalion, and the direct support artillery battalion.

b. Land Bases. For communication planning, the minimum land bases required to support the riverine force are a division main/division base and a brigade base. The brigade base is comparable to brigade trains less the combat-essential elements that are afloat. Provision is made for incorporation of a division forward CP when and if required.

c. Interconnecting Communications. Radio and multichannel radio links connect land and afloat bases, ships and boats operating on the waterway, ground forces, and security forces. Figures 6–6 and 6–7 represent a brigade communication plan.

6–22. Communication Equipment

a. Normally the communication equipment that Army personnel use aboard the APB's, APL's, and CCB's of the riverine force is permanently installed. This equipment is Navy-provided and part of the ship's design. It may be a mixture of Navy (primarily), Army, and Air Force equipment and will net with similar Army equipment ashore. This communications equipment is not the normal tables of organization and equipment (TOE) authorization of the Army units aboard ship.

b. Brigade units normally keep the TOE or modification table of organization and equipment (MTOE) aboard the APB or APL or at the land base. Typical items of equipment kept on the afloat base are portable radio sets for use by debarked forces, telephones to augment APB and APL facilities or for shore operations, and field wire required for shore use.

c. When APB, APL, and CCB lack necessary communications equipment installed for riverine use, special arrangements by joint Army and Navy agreement may be necessary.

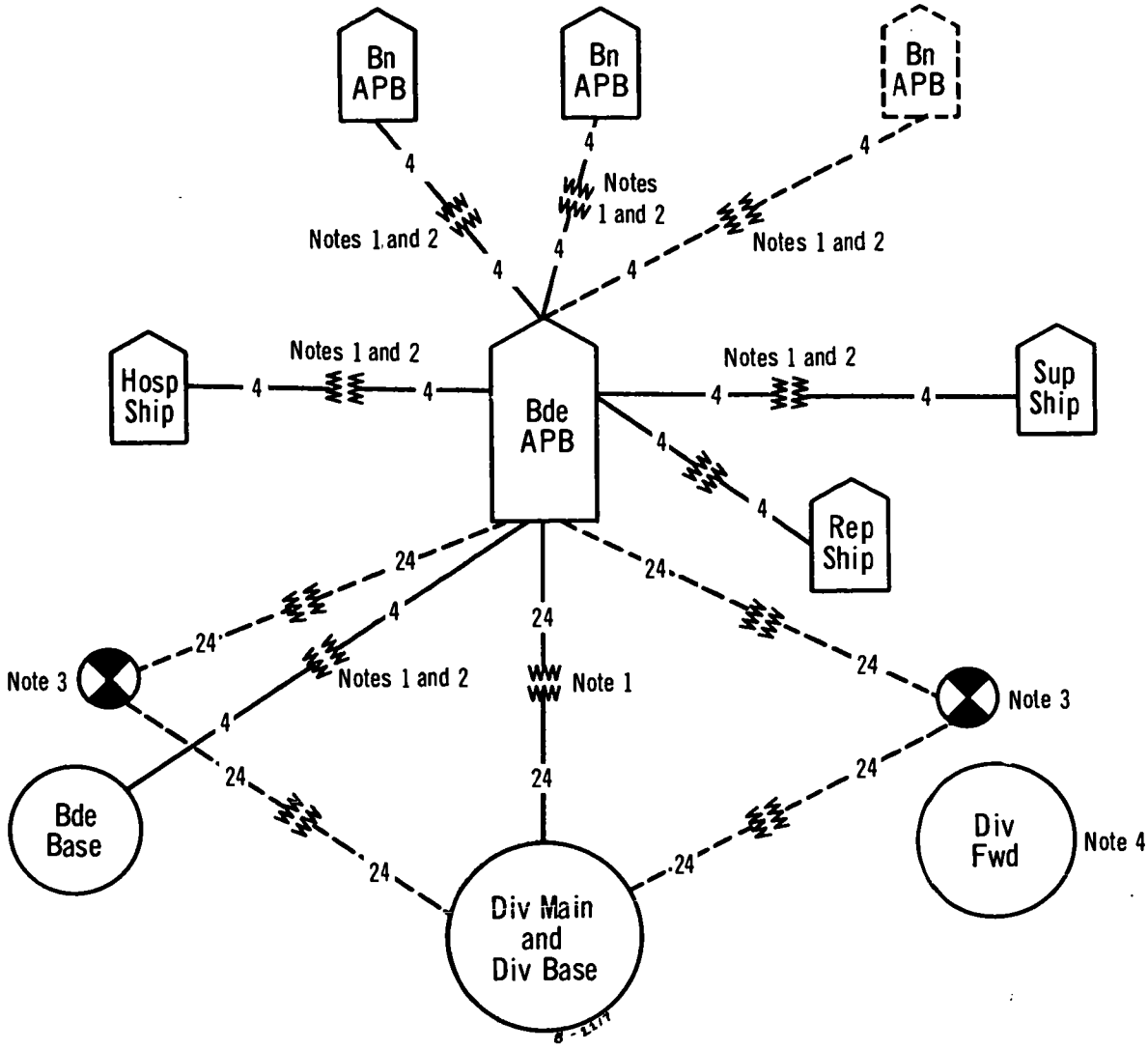
Net	VHF FM voice nets														HF AM voice nets				UHF voice	RATT nets			
Ststion	Div* CG comd (FM)	Flot* comd & con (FM)	Bde* comd 3 (FM)	Bde* O&I (FM)	Bde* sdmin/ log (FM)	Arty* FD (FM)	Arty* comd (FM)	AF* ln (FM)	RF* com- mon/ helo (FM)	RB* def- ense (FM)	Bn* comd (FM)	Bn* admin/ log (FM)	RAS* per bn (FM)	Aja* unit or host country ln (FM)	Bde* air-ground (FM)	Bde comd 1 (AM-SSB)	Nsvy comd (AM-SSB)	AF sir req (AM-SSB)	Bn comd (AM-SSB)	AF tac sir dir (UHF-voice	Div op/ intel (HF)	Div sdmin/ log (HF)	Nsvy comd (UHF)	Bde comd 4 (GP) (HF)
Bde APB	X	X (NCS)	X (NCS)	X (NCS)	X (NCS)	X	X	X (NCS)	X (NCS)	X (NCS)				X[1]	X	X (NCS)	X (NCS)	X	X[4]	X	X	X	X[1] (NCS)	X (NCS)
Bde CCB		X[3]	X	X	X[1]	X[1]		X[1]		X[3]				X[1]		X	X[3]	X		X				
Bde baae			X	X	X			X						X[1]		X	X	X			X	X	X	X
Bn APB		X	X	X	X	X	X	X[1]	X	X	X (NCS)	X (NCS)	X	X[1]		X	X	X[1]	X	X[1]			X	X
Bn CCB		X[3]	X	X		X				[3]X[1]	X	X	X	X[1]		X	X[3]	X	X	X[1]				
Debarked bn			P	P	P	P		P[1]			P	P	P[1]	P[1]		P		P		P[1]				
Arty CCB		X[3]	X	X		X (NCS)	X (NCS)		X[1]	X[1]	X[1]		X	X[1]		X	X[3]							
Supply ship		X			X				X	X													X	
Hoapital ship		X			X				X	X													X	
Repair ahip		X			X				X	X													X	
Other boats aa required						X[1]			X	X			X											
AF DASC or Abn FAC						X[2]	X[2]	X[2]										X[2]		X[2]				
Each embarked co						P					P	P												

[1]Provided if required.
[2]Air Force-provided.
[3]Navy operated in wheel house. May be remoted into operations center.
[4]May be used to monitor any subordinate battalion comd net.

LEGEND

RF–Riverline force.
RB–Riverline base.
RAS–River ssssult aqusdron.
P–Portable radio aet.
X–Inatalled radio aet.
*–Speech secure.

Figure 6–6. Type radio nets for a riverine force



NOTES:

1. Current multichannel radio equipment to be replaced by new PCM equipment when available.
2. Radio terminal sets AN/GRC-163 are also a possibility if frequency interference does not prohibit.
3. Shore-based multichannel radio repeaters are located on advantageous high ground to insure communications from division to bde APB. Only two repeaters are shown as types.
4. Radio multichannel terminals may operate from division forward if required.

LEGEND

–Ship or boat.
–Land base.
– – –Operational as required.
–Multichannel radio repeater.

Figure 6–7. Type radio multichannel networks for a riverine force.

Ships and craft may be outfitted largely with brigade and battalion TOE signal equipment or equipment obtained by special authorization. This may involve the dismounting of equipment from organic vehicles, in which case the contributing organization must be augmented accordingly. Necessary electrical power for the Army communication equipment is ship supplied.

6–23. Radio Communications

a. A type radio communication plan for a brigade is shown in figure 6–6. Emphasis is primarily on the communications required by the Army forces; however, the flotilla command and control net and the RAS net (both Navy) are included since their traffic is of direct interest to brigade and battalion commanders.

b. Because of the large number of radio sets aboard the various ships and boats, especially the brigade and battalion APB's, some type of antenna-patching or an antenna-switching facility is necessary. Such a system assists in overcoming the radiation problems that occur in a crowded shipboard installation. In addition, an antenna patching system serves as a positive measure of systems control and facilitates the exercise of radio net discipline.

6–24. Multichannel Radio Communications

A type multichannel radio communication plan for a brigade is shown in figure 6–7.

a. Ship-to-Shore Communications.

(1) A type radio multichannel network from division main/division base to the brigade APB requires 24 channels. Multichannel radio repeaters advantageously located ashore, on high terrain if available, insure continuous communications. The brigade CP ashore (or brigade rear) is normally linked by the division multichannel network to the brigade APB. Provisions are necessary to extend a minimum of four-voice channels from the brigade APB to a brigade forward CP, when established. These networks provide common- and sole-user voice and the necessary teletypewriter circuits. Division main and division base are presumably collocated.

(2) If a division forward is established, multichannel terminals at this site provide communications to the brigade APB. In this event, a second 24-multichannel network from division forward to division main/division base is established; communications from the brigade APB to division main/division base may be then on a switched or "strap-through" basis out of division forward. The division signal battalion may require augmentation to provide this support.

b. Ship-to-Ship Communications. Separate four-channel terminals aboard the brigade APB provide common- and sole-user voice and teletypewriter circuits to four-channel terminals aboard each battalion APB and each essential combat service support ship. This communications equipment is not normal TOE authorization of the division/brigade signal organization. Experience indicates that a hospital ship, supply ship, and repair ship are minimum essential support ships for a riverine force of brigade size.

6–25. Division Signal Battalion Support

a. General. The many variations possible in riverine operations prevent establishment of rigid guidelines for the employment of division, brigade, and battalion communications systems. However, division communications as described in FM 11–50 remain generally applicable for the organization and employment of the division signal battalion. Resources of the forward communications company are required for direct support to brigades and battalions with assistance from the remainder of the signal battalion as required.

b. Division Main/Division Base.

(1) Elements of division headquarters company and support command are located at division main/division base and use the communication facilities organic to the command operation and signal support operation companies. This complex requires entry into an area communications system or equivalent communications network to provide contact with the next higher headquarters. These facilities are provided by the next higher headquarters.

(2) The tactical situation, units in the division base, and the additional facilities required for riverine operations determine the supplemental communication center service required from the command operations and signal support operations companies. For example, if a combat support coordination center

(CSCC) is established at the division base, demands for supplemental communication center service will increase.

c. Brigade Support. The division signal battalion organizes and trains mobile radio teams equipped with HF–SSB voice or VHF–FM voice radio sets. These radio teams are either motorized or equipped with portable equipment to augment the facilities of maneuver battalion headquarters and certain liaison teams—the liaison teams to host country, U.S., or allied military forces. Elements of the forward area signal center platoon and one forward command terminal section of the forward communications company normally provide communication support to a brigade. The division signal battalion may require augmentation to provide this support.

6–26. Brigade Communications

a. Afloat Base.

(1) *General.* When a brigade operates from an afloat base, the brigade headquarters and other personnel are assigned to and billeted aboard an APB. This ship also serves as the flag ship for the naval river assault flotilla commander. Communication facilities to satisfy both the flotilla and brigade commander's requirements for all aspects of command control and support during riverine operations are necessary.

(2) *Shipboard communications.* Typical communication facilities installed aboard a brigade APB are shown in figure 6–6. This shipboard communication facility provides the necessary means to maintain all required radio nets, to operate a telephone exchange, and to establish a communications center with teletype terminations. Brigade organic and attached signal elements may require augmentation to operate this shipboard system. Communications are established with base security forces ashore and with brigade command elements operating aboard a CCB. A VHF multichannel radio to a land-based area signal center terminates onboard the brigade APB. This multichannel link gives the brigade commander aboard the APB 24 voice channels for entry into the area or division communications system.

b. Land Base.

(1) *General.* Riverine land-based internal communication installations are similar to those facilities normally provided in a semipermanent conventional military camp or garrision containing a part of the division. External communications from a land base to higher and lower headquarters are operational requirements; therefore, they take precedence over the installation and operation of an internal communications system.

(2) *Land-based communications.* Brigade elements and their organic and attached or supporting signal units normally are adequate to operate and maintain land base facilities required for all forces attached to the brigade. The time available and the communications facility already in operation determine the elaborateness of the communications system established in a land base. Supplemental internal communication considerations as described for the afloat base apply equally to the land-based complex. Wire is the primary means for internal base communications. Camp security outpost positions and airstrip facilities require radio backup.

c. Brigade Command and Control Communications.

(1) *Command helicopter.* During combat operations, the brigade commander normally commands from a command and control helicopter. The Navy Commander also may operate from this aircraft during RAS Operations. Communications equipment installed on these helicopters varies in quantity and composition. Current production models contain from two to four VHF(FM) voice radios and some models have an additional UHF(AM) radio for air controller use. Similar equipment, in a slightly different configuration, is also available for airborne FM automatic voice retransmission in support of riverine operations.

(2) *Brigade CCB.* A CCB is available to establish a waterborne brigade forward or a tactical command post. This boat has the communications facilities that the brigade and flotilla commanders need to control the RAS and movement of the embarked Army unit to the objective area. The CCB may also be a communication radio retransmission station, if necessary. Figure 6–6 shows a typical brigade CCB radio-net structure.

6–27. Battalion Communications

a. Afloat Base.

(1) *General.* Normally, one infantry battalion and associated combat support and combat service support elements are billeted aboard an APB or an APL.

(2) *Shipboard communications.* Typical communications facilities for a battalion APB are shown in figure 6–6.

b. Battalion Command and Control Communications.

(1) *Command helicopter.* The use of helicopters and the communication facilities available is the same as for brigade command and control helicopters (para 6–26*c*(1)).

(2) *Battalion CCB.* The use of a CCB and the communications facilities available to the battalion and RAS commanders is the same as for brigade and flotilla commanders (para 6–26*c*(2)). In addition, the battalion CCB radios may relay requests for supporting fires, and transmit adjustments. Figure 6–6 shows a typical battalion CCB radio-net structure.

c. Debarked Battalion. Once ashore, the debarked battalion headquarters operates in the radio nets shown in figure 6–6.

d. Embarked Company. En route to its land objective, the embarked rifle company has a requirement for the radio sets shown in figure 6–6. Once ashore, the company uses standard radio nets as prescribed by battalion signal operation instructions (SOI).

e. Heliborne Infantry Battalion Communications. Standard communication doctrine and techniques apply to airmobile operations in the riverine environment. However, when airmobile units operate more than 20 kilometers from base areas, they need a man-portable HF SSB, continuous wave (CW), in addition to TOE allowances.

6–28. Artillery CCB

Figure 6–6 shows a typical artillery CCB radio-net structure. A CCB or an LCM(8) is necessary for the forward control of artillery fires from the waterway. The artillery CCB or LCM(8) may require additional radio sets for essential fire control.

6–29. Other Ships and Boats

a. Combat Service Support. Experience indicates that a supply ship, hospital ship, and repair ship are essential combat service support for a brigade riverine force. Minimum essential communication requirements for each of these ships are identical and are shown in figure 6–6 and 6–7.

b. Other Boats. Army units use other boats as required (fig. 6–6).

Section V. INTELLIGENCE

6–30. General

a. FM 30–5, FM 32–10 and other field manuals in the FM 30- and 32- series contain the general doctrine, methods, and procedures for collecting, processing, and disseminating intelligence. The procedures discussed in these manuals vary in their application in riverine operations. This section contains information on special aspects of intelligence that apply specifically to operations in a riverine environment.

b. In addition to the combat intelligence needed to support offensive operations and base area defense, a requirement exists to support—

(1) Host country internal security and internal development operations.

(2) PSYOP.

(3) Civil affairs operations.

(4) U.S. military and civilian advisory assistance programs.

(5) Intelligence operations established by higher headquarters.

6–31. Sociological, Political, and Economic Considerations

a. Basic intelligence includes population size and distribution; basic racial stock and physical characteristics; ethnic and minority groups; social structure; health organization and capabilities; religion, culture, and political tendencies; and organizations in areas adjacent to land and afloat bases and in prospective AO's. This basic intelligence assists in the development of intelligence sources in the area and is essential to the success of psychological and civil affairs operations.

b. Among important local economic consid-

erations are the income-producing activities (agriculture, fishing, etc.), transportation, food supply sources, and living conditions at various social levels. Tactical operations that improve the economy usually result in better intelligence, more successful tactical operations, and less effective enemy activities. Conversely, friendly operations that unnecessarily disrupt or destroy the economy tend to confirm enemy propoganda and to gain local support for the enemy forces.

c. The enemy's use of inland waterways and his attempts to control friendly use of them demand special attention. Barricades or obstacles often may restrict friendly military movement, but allow local watercraft to reach market areas. Enemy tax stations at various locations restrict or harass movements of food and supplies. The securing of routes for transportation of rice or other agricultural products to market becomes important to the local population who depend on the income from the sale of such products.

6–32. Intelligence Collection Consideration

a. Adaptation of Conventional Intelligence Agencies, Sources, and Techniques. Conventional intelligence collection agencies, sources, and techniques are adapted to the riverine environment and the local enemy forces. Procedures that clearly define the responsibility for intelligence collection and exploitation are necessary for all U.S. Forces and agencies operating in a riverine area.

b. Sources for Information. Host country units, agencies, and individuals are primary sources for information about the area. When possible, division units exploit these sources through the U.S. military and civilian advisors working with them. Province and district SOICC provide a mechanism for quickly obtaining collected information. Initial contact is made with U.S. advisors to establish procedures.

c. Tactical Air Reconnaissance and Air Battlefield Surveillance.

(1) Visual air observation provides responsive and detailed surveillance of a riverine area to detect enemy activity. As an observer becomes more familiar with an assigned area, he can more readily detect changes in the topography and evidence of enemy activity (obstacles on land and water, LOC, land and water traffic, fortifications, weapon emplacements, and propaganda displays). Air observation can continue during darkness, by using night vision devices.

(2) Because of the contrast in riverine topography between wet and dry seasons, aerial photography updates existing maps and produces map supplements for tactical unit commanders down to the platoon/boat level. Aerial photography, particularly during periods of low-water level, may identify the main channel of waterways and obstacles—fishtraps, sandbars, water vegetation, entrapped debris, and enemy-emplaced obstacles. Night aerial photography provides a capability for night surveillance along LOC. Night photography, however, has the disadvantage of requiring visible artificial illumination. Repetitive, detailed interpretation of photos detects enemy activities. As the imagery interpreter becomes familiar with the area, he can readily detect changes in the topography and evidence of enemy activity.

(3) Side-looking airborne radar (SLAR) is well suited for near all-weather repetitive coverage of large areas and for surveillance of linear distances such as coastlines and international boundaries.

(*a*) When the SLAR has an in-flight processing capability, it may produce near real-time target data information in the aircraft cockpit for transmission to an appropriate ground or airborne station.

(*b*) Limitations exist in the resolution of both moving and stationary targets with the SLAR system. Boat traffic cannot be identified as to size, shape, or type. SLAR imagery cannot detect or identify small stationary tactical targets against a land background.

(*c*) Fixed target imagery from a SLAR can provide readily available, accurate mapping of uncharted areas or areas previously mapped inaccurately. (Silting constantly changes the configuration of islands, channels, and beaching locations along major waterways and coastal areas.) Although radar mapping cannot be used when great detail is required, it does afford up-to-date, fairly constant-scale reproduction of a riverine area.

(4) Infrared imagery, which records thermal emissions, is particularly effective for

passive nighttime surveillance of waterways. This type of surveillance may indicate the general size and shape of watercraft. Other infrared targets include heat emissions along LOC and in suspected enemy locations.

(*a*) The infrared system has limited capabilities for detecting heat sources through heavy cloud layers, dense jungle or tree canopies, or similar heat-absorbing environments.

(*b*) When employed to detect heat emissions or other activities along riverbanks and trail systems and inland areas, the infrared sensor either complements or supplements other means of surveillance. It can confirm or deny the existence of targets reported by other intelligence sources.

(*c*) An infrared sensor can readily detect moist areas or hidden streams due to temperature variance.

(5) The commander employs simultaneous multisensor coverage of the area of interest when possible.

d. Ground Surveillance and Reconnaissance.

(1) Ground surveillance and reconnaissance are within the capabilities of all maneuver units. They are accomplished either as part of the normal unit SOP or as a result of the commander's specific intelligence requirements. Effective ground surveillance and reconnaissance are difficult in riverine areas because the dispersed and frequently isolated operations often prevent mutual support by units on the flanks and in the rear. Therefore, battalions may have difficulty in providing their own all-round defense without reducing their offensive capabilities. Reconnaissance elements may have to perform security-type missions for land and afloat bases and combat bases or serve as a reserve maneuver force.

(2) The employment of ground surveillance devices takes full advantage of their all-weather, day-and-night capability. Surveillance radars, anti-intrusion devices, night vision devices, and searchlights complement human reconnaissance and surveillance. These devices are essential to land and afloat base defense, and they support offensive operations in AO's.

(3) Details on patrolling in a riverine area are contained in paragraphs 5–1 through 5–7.

e. Employment of Specialized Intelligence Agencies.

(1) The employment of the military intelligence detachment attached to the division is similar to that provided in FM 30–9. Division requirements for imagery interpreters may increase because map supplement imagery requirements increase.

(2) Electronic warfare operations and that support provided by the U.S. Army Security Agency (USASA) Division support company are planned to support riverine operations.

(3) Special forces detachments operating in the riverine area can provide information and intelligence to the riverine force.

(4) Long-range patrols are discussed in paragraph 5–4.

f. Mobile Intelligence and Civil Affairs Team. A mobile intelligence and civil affairs team (MICAT), organized as shown in figure 6–8, enters the AO before the operation begins. The MICAT collocates with governmental facilities in the AO and obtains information of benefit to the riverine force in planning the operation. MICAT is land based and moves from one area to another in advance of the riverine force to compile intelligence and to plan PSYOP and civic action operations that will aid the units on arrival in the AO. To prevent disclosure of scheduled operations, the MICAT periodically visits areas where no operations are scheduled.

(1) The duties of MICAT civil affairs personnel include but are not limited to coordinating with U.S. advisory personnel, Agency for International Development (AID), and province/district officials concerning—

(*a*) The present status of revolutionary development in the area.

(*b*) The status of hamlets in the AO.

(*c*) A listing of projects that the riverine force can undertake to complement the local governmental revolutionary program.

(*d*) Locations to conduct medical civic action projects/dental civic action projects (MEDCAP/DENTCAP).

(*e*) Surveys of areas that may be of special interest to the riverine force.

(2) The duties of MICAT PSYOP personnel are—

(*a*) To study and analyze intelligence in the planned AO.

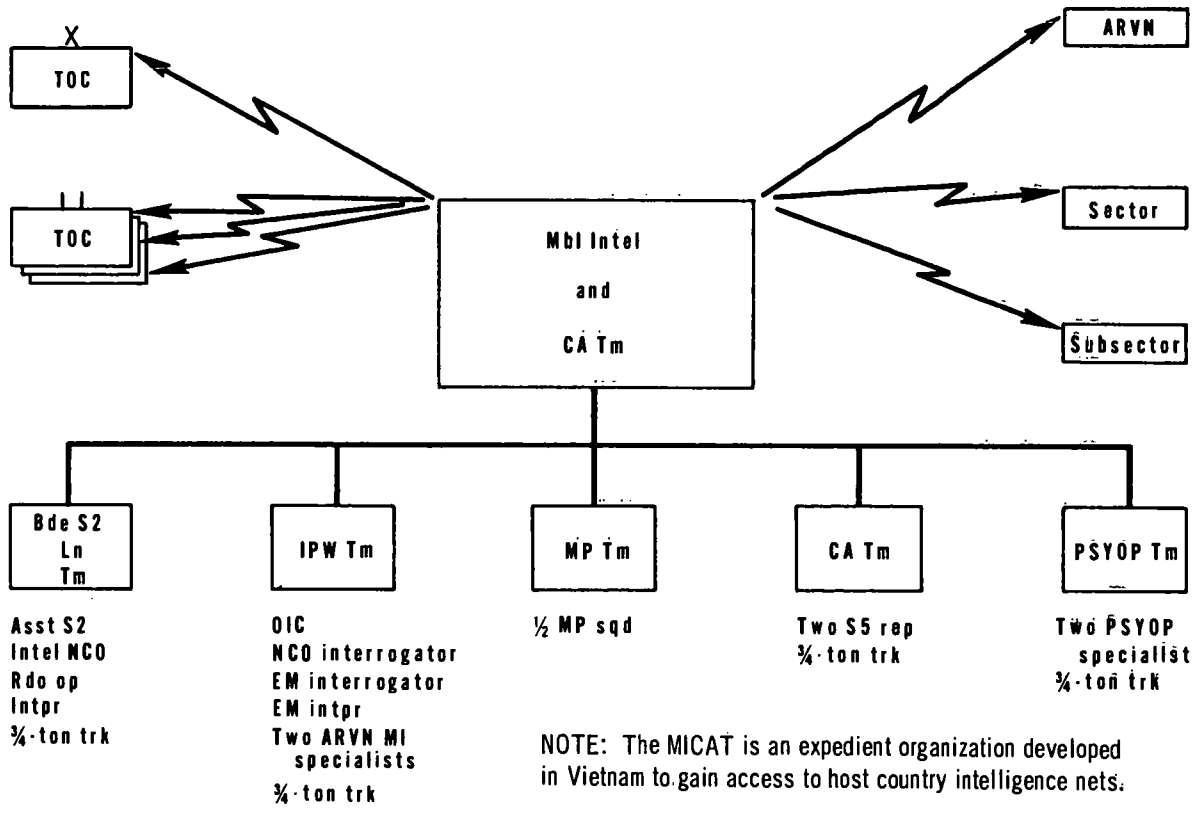


Figure 6–8. Mobile intelligence and cival affairs team.

(*b*) To extract from this intelligence information of value in planning PSYOP support for operations.

(*c*) To interview defectors and prisoners of war in order to collect information on enemy morale, activities, and weaknesses of value in determining PSYOP themes for the particular area.

6–33. Security and Counterintelligence

a. Effective counterintelligence increases both the security of riverine forces and the probability of surprising enemy forces. The presence of large numbers of civilians in the area and the difficulty of identifying enemy personnel among them frequently complicate counterintelligence activities in riverine areas.

b. Counterintelligence operations rely on information from civilian informants concerning enemy activities—sabotage, subversion, and espionage.

c. Efforts to prevent premature disclosure of tactical operations are difficult. Local civilians, a number of whom may support the enemy forces, constantly observe the riverine force. Every individual and unit in the area not only must understand necessary security measures but also must observe them; counterintelligence specialists, alone, cannot achieve and maintain security of information.

d. Riverine bases are particularly vulnerable to enemy sabotage because of the difficulty of controlling the waterways. A combination of physical security measures, orders, and controlled access to information and installations provides the best defense for bases. Only carefully screened, essential civilians are allowed entrance to land or afloat base areas; and constant control and supervision of them are necessary to reduce sabotage.

e. Care must be exercised to prevent the enemy force from effectively employing cover and deception techniques against the friendly forces.

Section VI. TACTICAL AIRLIFT

6–34. General

Tactical airlift is the means by which aircraft deliver personnel, supplies, and equipment on a sustained, selective, or emergency basis to dispersed sites under a wide range of climate, terrain, and combat conditions (FM 100–27). This airlift increases the Army's battlefield mobility by air-landing or airdropping combat elements and providing them sustained logistic support. The U.S. Air Force may sustain an air line of communications (ALOC) for Army forces in a riverine area. Army aviation units augment the Air Force capability for movement, supply, and resupply operations; and they support combat elements as operational requirements dictate. Air Force and Army aircraft complement each other in tactical airlift. FM 57–1 and FM 57–35 provide information in airmobile and joint airborne operations.

6–35. Army Aviation Airlift

a. Airmobile Operations. Paragraphs 4–7 through 4–11 describe airmobile operations. The division aviation battalion and nondivisional aviation units can introduce troops into an AO rapidly. The division's airlift capability is limited, however, and operations require careful planning and detailed coordination to be effective. Operations involving the simultaneous airlifting of more than one battalion requires nondivisional aviation units.

b. Medical Evacuation. Helicopters provide rapid evacuation of casualties from AO's. Prompt and speedy removal from land or afloat aid stations can save lives.

c. Artillery Positioning. Helicopters frequently position or reposition artillery and, in some cases, may be the artillery's only means of displacing.

d. Combat Service Support. Often, air movement of essential supplies is necessary to maintain the momentum of offensive operations. Helicopters frequently resupply artillery ammunition in the AO.

6–36. U.S. Air Force Airlift

Air forces may be tasked to provide tactical airlift support to riverine forces. Air forces may operate from airfields adjacent to land or afloat bases or from outside the riverine area. Detailed planning and coordination are essential when using airlift support. Air Force troop carriers deliver airborne troops to an objective area by airdropping or air-landing. When airfields are available, Air Force troop carriers can preposition units and supplies (in coordination with appropriate Army Logistical elements) in preparation for future operations. Resupply is accomplished by air-landing, or airdropping—LOLEX (low-level extraction system), PLADS (parachute low-altitude delivery system), or LAPES (low-altitude parachute extraction system). An ALOC, may have to be used to support riverine operations in some instances. With necessary prior coordination, Air Force aircraft may be used for medical evacuation.

Section VII. PSYOP

6–37. Concept

a. Host country psychological campaigns aim at all elements of their society as well as the enemy forces. Emphasis in internal defense and internal development operations in riverine areas is directed at reorientation of people who support the enemy forces or at the enemy forces themselves. These reorientation efforts, essentially surrender programs, are of three general types:

(1) Amnesty, where an individual is offered amnesty on renouncing the enemy cause and returning to the side of the government.

(2) Fear, where the host country has such control of the situation and populace that it can afford to adopt a firmer policy of either unconditional surrender or death.

(3) Reward, where an individual is offered money to secure allegiance or support.

b. Both U.S. and host country tactical PSYOP conform to generally accepted techniques and media to support offensive operations. FM 33–1 and FM 33–5 contain information on these techniques. In densely populated areas, consolidation PSYOP assumes increased importance.

c. Themes employed are simple. Attempts to "sell" abstract concepts such as national solidarity or possible third country encroachment to rural agrarian societies usually are not successful.

d. Host country personnel should write all propaganda because U.S. personnel normally cannot present thoughts that appeal to the target audience as well as someone familiar with the customs, religion, and background of the target audience.

6–38. Purpose

. *a.* PSYOP support offensive operations and base security in a riverine environment for the same basic reasons as in other areas:

(1) To reduce the combat efficiency of the enemy military forces.

(2) To support the combat effort by modifying or manipulating attitudes and behavior of special audiences.

(3) To facilitate reorganization and control of areas regained from enemy control, operating in conjunction with civil affairs and host country government.

(4) To induce enemy units and individuals to defect.

(5) To win the cooperation of allies and neutrals in support of U.S. and host country efforts.

(6) To exploit the population as a source of intelligence.

b. PSYOP are planned, coordinated, and integrated military operations, employing propaganda and spreading ideas orally, or through printed matter. Propaganda, or the manipulation of ideas, increases in importance in an internal defense and internal development environment. When the opposing military objective is based on ideology rather than a pure struggle for political or economic power, the most effective weapons and tactics will also be ideological. Fighting ideas with ideas rather than with firearms seems more feasible. All types of propaganda (black, white, and gray) apply to riverine operations. However, the transmission of propaganda is restricted to host country methods; e.g., propaganda cannot be transmitted over civilian radio frequencies if the majority of the civilian population does not have access to radio receivers.

c. Two general types of division PSYOP are—

(1) Tactical PSYOP, which are actions directed against enemy forces and friendly or neutral civilians in areas under enemy control.

(2) Consolidation PSYOP, which are actions directed toward friendly or neutral civilians, friendly forces, and enemy or enemy sympathizers in areas under friendly control. In areas subject to enemy subversion, consolidation PSYOP in support of the host country government may be the military commander's first effective psychological means to maintain stability. During hostilities, these operations also help to prevent sabotage and espionage.

6–39. Planning and Coordination

a. Tactical PSYOP, as well as the overall staff supervision for PSYOP, are the responsibility of the G3/S3. Consolidation PSYOP are the staff responsibility of G5/S5. During internal defense and internal development operations in a riverine environment, no clear distinctions exist between the area and phases of tactical PSYOP and consolidation PSYOP. This requires close coordination and integration between tactical PSYOP and consolidation PSYOP.

b. The chief of the U.S. diplomatic mission to the host country has overall responsibility for U.S. PSYOP in internal defense and internal development. Any PSYOP campaign that U.S. forces initiate must conform with policies of the U.S. diplomatic mission or its designated agent for information, the United States Information Service (USIS) of the United States Information Agency (USIA). Any subdivision of either agency, such as a joint United States Public Affairs Office (JUSPAO), that is designated for a specific purpose is included. These agencies normally are represented at the political level at which the division G3 and G5, and possibly the brigade S3 and S5, coordinate. Coordination with host country information and PSYOP agencies, at all levels, should be handled through the U.S. military advisors.

Section VIII. ARMY AVIATION

6–40. General

The mobility provided by Army aviation units adds to the flexibility of the Army commander conducting riverine operations. Helicopters airlift personnel and materiel needed to meet many of the requirements of these operations, and gunships deliver responsive fire support where and when needed. The helicopter's ability to move virtually without regard to terrain obstacles, to land on very small land areas, or to perform tasks by loading or unloading while hovering over areas in which no land is available gives supported riverine forces a distinct advantage over forces lacking aviation support. FM 1–100 provides general doctrine and guidance for the employment of Army aviation in support of military operations on land. This section provides information on specific tasks that helicopter units can perform in support of forces engaged in riverine operations.

6–41. Ambush

a. Enemy. Air observers can detect points of likely ambush or enemy activity indicating the preparation of an ambush and provide information for use by friendly troops in avoiding or countering the ambush.

b. Friendly. Observation of repeated enemy use of certain waterways can provide opportunities for the establishment of ambushes by friendly forces. Helicopters, using deceptive means, can transport troops to points at or near the location of the planned ambush.

6–42. Interdiction

a. Day. Gunships can deny enemy watercraft free use of waterways. Observation helicopters, supported by on-call gunships or quick-reaction watercraft, can accomplish the same mission. The enemy's awareness that movement of his watercraft is under observation can cause him to reduce or discontinue use of the waterways during daylight.

b. Night. The availability of night observation means permits interdiction operations at night. A successful technique is the use of a searchlight-equipped helicopter to locate and illuminate enemy craft for destruction by gunships.

6–43. Helicopters Operating With Airboats and Air Cushion Vehicles

a. General. Helicopter teams support watercraft operations to form an effective fighting unit and to promote an important advantage over conventional units operating in the riverine environment.

b. Security. Helicopter elements provide armed escort during movement of watercraft. When the movement unit is ambushed, gunships can engage the ambushing force and provide suppressive fire to cover the advance or withdrawal of the surface elements.

c. Armed Reconnaissance. Helicopter crews can direct escorted airboats and air cushion vehicles over selected routes to avoid terrain obstacles and suspected ambush sites.

d. Finding and Fixing. Helicopters can find and fix enemy positions, develop the situation, and direct the movement of surface elements to the site.

e. Blocking Force. Helicopter elements can aid in blocking the retreat or advance of enemy elements while allowing friendly forces sufficient time to maneuver.

f. Reaction Force. Helicopter elements can move quickly to any point on the battlefield to aid in exploiting a success of the maneuver elements or to deliver direct fire support to allow the surface elements to maneuver.

CHAPTER 7

COMBAT SERVICE SUPPORT

Section I. GENERAL

7–1. Basic Considerations

a. The principles, techniques, procedures, and organizational concepts of combat service support in Army field manuals in support of divisions, brigades, and battalions conducting ground, airborne, or airmobile operations apply with modifications to riverine operations. The basic dissimilarity in riverine operations is the extensive use of ships and watercraft to provide combat service support.

b. A riverine environment severely restricts movement overland. Except for a few primary highways, interconnected road nets are often nonexistent. The extensive use of waterways to move supplies and personnel partially overcomes this disadvantage. Helicopter and fixed-wing aircraft may also provide combat service support.

c. Other factors requiring special consideration are the need for increased control of individuals and traffic in the area of operations (AO); the lack of suitable landsites for large, semifixed combat service support installations; the requirements for support of watercraft and associated equipment; and maintenance problems aggravated by the weather and terrain.

d. The economical use and the conservation of combat service support resources are paramount.

e. Plans make provisions for civic action supplies, services, and medical treatment for civilians in the AO.

f. Combat service support in a riverine environment is primarily support of land and afloat bases and operations launched from these bases.

g. Backup support provided by higher echelon is that normally available from the field army support command (FASCOM) and its support brigades. FM 54–2, FM 54–3, and FM 54–4 contain detailed information on this support.

7–2. Responsibilities

a. Each Service is responsible for administration and logistic support of its component forces. Joint operations in riverine areas require close coordination of combat service support to make the best use of the limited facilities and available lines of communications (LOC).

b. The Army component commander supplies and maintains common and Army-peculiar items to both Army and Navy forces. The Navy component commander supplies and maintains Navy-peculiar items and provides transport to move Army supplies. The Army and Navy commanders of the riverine force are mutually responsible for coordinating logistic support and determining the specific arrangements and procedures to accomplish the mission.

Section II. SUPPLY

7–3. General

a. Forces stationed on either an afloat or a land base receive support from combat service support installations outside or on the periphery of the riverine area, initially. As suitable areas become available, combat service support

installations are established within the riverine area.

b. Coordinated Army and Navy supply activities insure the most efficient use of limited transportation resources, supply personnel, and available storage facilities. In addition to normal resupply, special items needed include assault boats, outboard motors, paddles and poles, life preservers, rope, waterproof matches and maps, waterproof bags, insect and leech repellant, and foot powder. Clothing and equipment wear out fast, thus increasing the normal replenishment rate.

7–4. Resupply of a Land Base

a. Truck transportation provides the most responsive means for resupplying a land base if an adequate LOC is available. Naval supply vessels are another means of transportation for resupplying a land base adjacent to a river or canal. Air movement may be used for high-priority or emergency resupply.

b. Supply policies and procedures for units stationed at a land base generally compare with those for resupplying base camps in non-riverine areas. The type and the amount of storage space available at the land base influence the stockage maintained.

7–5. Resupply of an Afloat Base

a. Periodic Resupply. Resupply ships and watercraft provide the primary means of transporting supplies between combat service support installations and an afloat base. Helicopters are an alternate or an emergency means of resupply.

(1) One landing ship, tank (LST) should be in the afloat base—on station—at all times. In addition to normal resupply missions, the LST of the river support squadron supporting the afloat base provides for—

(*a*) Storage of a portion of the afloat unit's basic load.

(*b*) Transportation of supplies, equipment, salvage, and personnel between the afloat base anchorage and the supporting combat service support installation.

(2) Each LST can carry and store a 10-day supply of dry cargo for a brigade afloat base. Army supply personnel and portions of maneuver elements may be billeted aboard the LST on station. Supply and transportation are handled—

(*a*) Either by using one LST continually on station as a floating supply point and resupplying periodically with a second LST. This is the preferred method based on combat experience.

(*b*) Or by using each of two LST alternately, with one supplying the afloat force when the other is replenishing supplies from the supporting installations. When this method is used, Army personnel billeted aboard the LST on station transfer to the incoming LST each time the ships rotate.

(3) In either method, a periodic replenishment cycle is necessary to keep reserve stocks from falling below a 3-day level.

b. Classes of Supply.

(1) *Class I.* Each self-propelled barracks ship (APB) and barracks ship (nonself-propelled) (APL) is initially stocked with a 30-day supply of rations. Resupply is by LST.

(2) *Classes II, IV, VI, and IX.*

(*a*) These supplies for Army units stationed on the afloat base consist primarily of fortification materials, individual clothing and equipment, personal demand items, and limited repair parts.

(*b*) Supplies for Navy elements on the afloat base consist primarily of repair parts and assemblies. Most of these items are carried aboard the repair ships (ARL). Resupply is by the LST or during periodic calls at a supporting shore base.

(3) *Classes III AND III(A).*

(*a*) River assault squadron (RAS) watercraft are refueled with diesel and JP–5 from the APB and supply LST. The supply LST refuels the APB's and other ships of the flotilla as required.

(*b*) Motor gasoline (MOGAS) for Army assault boat outboard motors, motor vehicles, and naval auxiliary engines is supplied from the landing craft, mechanized (LCM (6)) refueler in each RAS. The 500-gallon collapsible tank provides a flexible means of storing and transporting MOGAS and diesel fuel aboard the LCM(6) refueler. The 600-gallon metal tank may also be used. Commercial barges or military yard tankers (YOG) may refill the LCM(6) refuelers periodically.

(*c*) A combination of stocks at an air-

field adjacent to the afloat base and stocks prepositioned for support of specific operations provide JP–4 and aviation gasoline (AVGAS) for supporting helicopter units. Command and control helicopters may refuel on the helicopter (HELO) barge normally deployed with the barge-mounted artillery.

(*d*) The LST supply ship provides resupply of packaged class III products.

(4) *Classes V and V(A).*

(*a*) Normally, that portion of the unit's basic load issued to individuals and weapons crews is stored on the AMMI barge. The remainder of the basic load may be stored either on the LST or on the armored troop carriers (ATC). Storing part of the basic load on ATC obviates the requirement to transfer class V items from the LST to other watercraft for resupply to an AO. Detailed load plans are necessary when ATC stock part of the basic load.

(*b*) Normally, ammunition for supporting Army aviation units is provided by the aviation units.

7–6. Resupply During Tactical Operations

a. ATC's, helicopters, air boats, or air cushion vehicles (ACV) may transport supplies to units in the AO. U.S. Air Force planes may provide backup resupply in the AO when the area and the nature of the operation warrant.

b. Unit distribution of supplies in the AO is normal procedure. Distribution of supplies in the AO is facilitated when supplies are packed in one-man loads.

c. One ATC can transport sufficient supplies for a battalion to conduct a 1-day operation. An additional 2-day supply for a battalion is transported in the ATC's carrying troops. The battalion S4 controls and issues these supplies. Howitzer ammunition accompanies the artillery piece aboard each watercraft. Watercraft or helicopters resupply artillery ammunition in the AO.

d. An LCM(6) refueler or helicopters normally transport bulk MOGAS to resupply assault boat outboard motors and motor vehicles in the AO. Refueling points may be established in the AO using a collapsible fuel tank. The tank will float in water and can be dropped by fixed-wing aircraft or helicopters or towed into position by watercraft.

e. Potable water, in 5-gallon cans or plastic containers, is distributed with rations in the AO. Purification tablets are available for use with water from local sources when potable water is not provided.

f. Development of a brevity code simplifies supply request procedures. With such a system, a code word or an alphabetical designator, transmitted by radio, identifies and requests a single item or several associated items of equipment or supplies to be issued.

g. Assault boats can transport supplies on shallow waterways, in relatively secure areas, to units within the AO.

h. Night kits include such items as mortars, starlight scopes, water, recoilless rifles, sundry packs, and items of personal clothing that are needed at night but are not needed during the day. Night kits are normally stored aboard the supply LST during the day and delivered to the AO each night.

Section III. MAINTENANCE

7–7. General

a. This section contains guidance for the organization and operation of maintenance units supporting Army forces conducting combat operations in a riverine environment. FM 9–30, FM 29–20, and FM 29–22 contain additional information on maintenance support.

b. Maintenance services include repair of materiel, supply of repair parts for organizational maintenance, and supply of replacement end items using operational readiness float procedures.

c. Direct support maintenance, provided by the division maintenance battalion, does not include maintenance of medical, cryptographic, automatic data processing/electronic accounting machine (ADP/EAM), air-delivery equipment, and personal and organizational clothing and equipment. Signal elements located in the division base provide direct support maintenance for cryptographic items. Direct support maintenance of medical, ADP, air-delivery equipment, and personal and organizational clothing and equipment is not accomplished within the division.

d. The size and the composition of the maintenance unit depend on the size, composition, and equipage of the supported force; the degree of support that the Navy forces (e.g., repairmen and test and tool sets) can provide; and the requirement to provide support to the Navy elements (which may be partly equipped with Army-type equipment).

e. The mission and the requirement for deviation from normal operational techniques influence the organization, equipment, and deployment of the maintenance structure providing support. Operations in a riverine environment require more reliance on an air or water LOC for resupply of needed end items and repair parts than on a ground LOC. Dependence on air and water transportation requires special orientation of maintenance support to provide needed capabilities and delete unneeded capabilities.

7–8. Principles of Maintenance Support for Riverine Operations

The organization and the operation of the maintenance support system follow these principles:

a. Detailed planning insures that units maintain minimum essential maintenance supplies and equipment consistent with planned operations.

b. Detailed analysis of the mission insures that maintenance units and teams contain minimum essential personnel.

c. Plans to provide transportation support of maintenance services consider all methods of transport. The commander allocates a part of the available airlift and watercraft to support maintenance units and teams.

d. Procedures for repair parts resupply are as simple as possible. Verbal requests for repair parts are acceptable. Maximum use of direct exchange reduces the number of unserviceable items of equipment.

e. Unit distribution of maintenance supplies and repair parts is the normal procedure in a riverine area. Packaging maintenance supplies and repair parts for distribution in the AO permits further distribution without using vehicles for transportation.

f. Contact teams from the maintenance battalion accomplish critical on-site maintenance in the AO. They accomplish normal maintenance tasks at the land base or the afloat base. Contact teams should have authority to perform controlled cannibalization in the AO, land base, and afloat base as an emergency method of obtaining critical repair parts.

g. Backhaul transportation (aircraft, watercraft, and available armored personnel carriers (APC) returning from supply or combat missions) evacuate materiel and deliver supply requests from using units.

h. Maintenance battalion elements in brigade areas evacuate items requiring complex repairs to the maintenance battalion's main support company in the division base camp. The main support company operates the primary repair parts supply point in the division.

i. Operational readiness float procedures provide serviceable end items in exchange for unserviceable end items.

j. Navy maintenance personnel augment the productive capacity of Army maintenance units and vice versa.

7–9. Maintenance Operations

A U.S. Army division in a host country develops a series of bases (base camp, land and afloat, combat, and patrol) to mount, control, and support operations in a riverine area. The number, size, and composition of these bases depend on the size and deployment of the committed force and the functions performed at these bases. An aircraft landing facility at each base facilitates operations.

a. Division Base Camp. The headquarters and main support company and the aircraft maintenance company of the maintenance battalion are in the division base camp to provide backup support to elements of the riverine force (Army, Navy, or both). Brigade elements may place equipment not suited to riverine operations in limited storage at the division base or the brigade land base.

b. Land Base/Afloat Base. These bases are semipermanent installations containing essential command, control, and combat service support elements for the organization (brigade or battalion) as well as any attachments necessary (e.g., boat and outboard motor maintenance personnel). The direct support maintenance personnel or elements attached for support of the brigade (less personnel and equipment detached for support of brigade

equipment that remains at the division base) provide support from the land base.

c. Combat Base. Battalion maintenance elements and direct support contact maintenance teams perform on-site maintenance services in combat bases (para 1–3*j*). The majority of this maintenance is performed on combat essential items. Less critical items of equipment are repaired either aboard the battalion APB or APL or at the land base.

d. Patrol Base. Contact maintenance teams, battalion or direct support personnel, move to patrol bases (para 1–3*k*) to perform necessary repair of combat essential items of equipment. On completion of the repairs, these teams normally return to the combat base.

7–10. Considerations Influencing Organization of Maintenance Units

a. Scarcity of adequate maintenance facilities and the need to support widespread units require decentralization and the increased use of contact teams by the maintenance battalion.

b. The riverine environment is unusually destructive to all types of electronic and fire control equipment. Daily cleaning of equipment is mandatory. Technical assistance to the user is necessary to insure effective organizational preventive maintenance.

c. Modifications in organizations and equipment eliminate the need for most types of heavy repair equipment, which may remain at the division base area. Limitations of the road net in the area may require substitution of lighter vehicles for the authorized vehicles. The existence of many navigable waterways in the area indicates that augmentation of the unit with boats and outboard motors is feasible for the movement of men and materiel. Air resupply of end items and repair parts in the AO may become necessary.

d. The joint nature of riverine operations requires the close coordination of maintenance support to obtain maximum advantage from the limited facilities and maintenance equipment available.

7–11. Direct Support Maintenance

a. This level of maintenance takes place in three general locations: in the AO by contact teams; at the afloat or land base by the forward support company, maintenance battalion; and at division base by the headquarters and main support company and the aircraft maintenance company of the maintenance battalion. Navy maintenance personnel, assigned to the ARL as part of the Navy riverine force, accomplish Army maintenance tasks within their capability.

b. Division direct support maintenance personnel aboard ARL ships perform maintenance on weapons, vehicles, communication/electronics equipment, outboard motors, generators, assault boats, and other fiber glass equipment. Repair facilities available aboard the ARL include office space; toolroom and repair parts storage area; and shops for repair of small arms and weapons, assault boat outboard motors, generators, and communication/electronics equipment. Repair and storage space aboard the ARL for Army maintenance tasks include the following:

(1) Communications/electronics equipment, Army and Navy—350 square feet.

(2) Repair parts storage, with storage bins—1,000 square feet.

(3) Small-arms repair—200 square feet.

(4) Operational readiness float storage, weathertight—300 square feet.

(5) Water level barge space for repairing fiber glass boats.

c. The difficulties of evacuating unserviceable major items require emphasis on contact teams operating forward with the units or responsive to their needs. Naval craft or helicopters accomplish required evacuation of equipment. These means, which are normally more secure than ground means, provide fast evacuation. Evacuation overland is less secure and requires security elements to accompany the movement.

d. Maximum use of an operational readiness float provides using units an immediate replacement for unserviceable equipment.

e. The forward support company elements operating at the afloat or land base perform their duties based on the following principles:

(1) Perform only those repairs that can be accomplished speedily, using the minimum of heavy repair equipment and heavy, bulky repair parts.

(2) Perform maintenance at the site of the equipment failure, using contact maintenance teams.

(3) Even though the headquarters and main support company normally accomplishes complex or time-consuming repairs at the division base, elements of the forward support company supporting a brigade may accomplish these repairs in the following instances:

(*a*) When a critical need for the equipment exists and the performance of repairs, regardless of complexity, is faster than obtaining an operational readiness float item as a replacement of the unserviceable equipment. Repair parts necessary to complete repairs in these cases may require airlifting or controlled cannibalization of similar items awaiting evacuation.

(*b*) When LOC are interrupted, the forward support company performs all repairs within its capability and obtains repair parts through controlled cannibalization of similar equipment.

(4) The commander allocates part of available transportation to maintenance elements for movement of contact teams, evacuation of materiel, resupply of repair parts, and movement of operational readiness float items.

(5) Perform overflow organizational maintenance for the brigade and assist Navy maintenance elements, as necessary.

(6) Provide the maximum number or repair components to brigade elements through direct exchange procedures.

f. The headquarters and main support company and the aircraft maintenance company, normally in the division base, provide direct support maintenance for units in the division base and backup direct support maintenance for the forward support companies in brigade areas. Contact maintenance teams from the companies in the division base perform their duties on site, when possible, repairing heavy equipment and aircraft in brigade areas or AO's. Unserviceable materiel that exceeds the repair capabilities of the forward support companies and contact teams from the division base is evacuated to the division base for repairs or further evacuation to field army support command (FASCOM) units. The headquarters and main support company operates collecting points in the division base for recovered U.S. materiel and captured enemy materiel.

7-12. Supply of Repair Parts and Operational Readiness Float Items

a. General.

(1) Quantities of maintenance supplies and repair parts stocked by units depend on needs of the unit, availability of transportation, and responsiveness of resupply. Repair parts stockage by maneuver units includes only combat essential items. The headquarters and main support company operates the division supply point for maintenance supplies and repair parts.

(2) Procedures for resupply of maintenance items are included in the standing operating procedure (SOP). Development of a brevity code simplifies supply request procedures. With such a system, a code word or alphabetical designator, transmitted by radio, identifies and requests a single item or several associated items of equipment or supplies be issued.

b. Repair Parts Supply.

(1) The repair parts supply element of the forward support company operates at the brigade base. Maneuver battalion maintenance personnel accomplish repair parts storage, requisitioning, and issue functions.

(2) The supply element of the forward support company provides repair parts and maintenance supplies to all units of the brigade and common items to the Navy element and to the maintenance elements of the company. Maintenance supplies and repair parts are combined with shipments of other types of supplies to use available transportation to the maximum. When possible, the forward support company delivers repair parts directly to the requesting unit.

c. Operational Readiness Float Items. The supply and transport battalion provides replacement of lost or destroyed end items. Headquarters and main support company, maintenance battalion, provides the division operational readiness float. Each forward support company provides a limited operational readiness float of end items to exchange for reparable end items. This float consists primarily of small arms, fire control instruments, and portable radio sets, and includes a limited quantity of other critical end items as determined by experience factors.

7–13. Destruction of Supplies and Equipment

Supplies and equipment are not abandoned. If units cannot evacuate equipment, they destroy it (except for medical items); SOP of all units include means and priorities for destruction. FM 5–25, the FM 23-series, and technical manuals dealing with specific types of equipment contain information on which to base destruction plans.

7–14. Organizational Maintenance

a. Preventive maintenance is essential to prevent overtaxing organizational maintenance capabilities. The condition of seals and the operation of valves and pumps require special attention. Individual weapons must be kept clean and dry. Because of the space limitations on board the APB and APL, users of equipment perform preventive maintenance services on their equipment onboard the AMMI barge moored to each barracks ship. Maintenance sheds or express containers (CONEX), placed on these barges, provide a storage area for organizational maintenance equipment and supplies.

b. Unit armorers and maintenance personnel aboard the APB and the APL perform organizational maintenance on all equipment deployed from the afloat force. Maintenance facilities available for a maneuver unit on board include a teletype/radio repair workshop, a radio/electronics workshop with test equipment, and a shop for small-arms maintenance.

Section IV. MEDICAL

7–15. General

a. Medical support in a riverine area follows the basic principles and practices of military medicine; however, provision of this support is more complex. The distances between supporting bases and AO's and the semi-independent nature of operations (particularly the waterborne phases) complicate medical treatment and evacuation. Medical service organization and procedures usually require modification.

b. Army medical personnel at land or afloat bases and Navy medical personnel of the river flotilla work together to support coordinated operations effectively. Joint medical facilities provide the most effective use of limited resources.

7–16. Medical Support of a Land Base

The Army commander provides medical services for all personnel stationed at a land base. Medical organization and procedures generally compare with those used to support base camps in nonriverine areas. A medical company of the division medical battalion, augmented as necessary by appropriate TOE 8–500 medical service teams, normally collocates with the brigade at the land base.

7–17. Medical Support of an Afloat Base

a. The base commander is responsible for medical care for personnel stationed on the afloat base. Navy medical corpsmen normally provide medical support for Navy personnel in the flotilla. The battalion medical platoon aboard each battalion APB or APL provides medical care for Army personnel embarked.

b. Small medical treatment facilities aboard APB's and APL's necessarily limit the care that may be provided at the afloat base. Medical care normally will be restricted to that treatment within capabilities that may restore patients to duty status or to that necessary for evacuation to medical treatment facilities ashore. Selected patients may be held in the AO for observation and care for limited periods in accordance with command policy to maintain combat effectiveness. The APB's and APL's have a landing pad for use of medical evacuation helicopters.

c. If watercraft are mined, 30 to 40 percent of the injured may require surgical treatment. The surgical capability of the medical company of the division medical battalion, augmented by appropriate TOE 8–500 medical teams, provides the necessary level of competence. A centralized medical facility for the afloat base may be established aboard a specially configured APB or APL, or an accessory LST may be provided for a mobile surgical hospital. Use of an LST or other similar craft to house a reinforced division medical company or surgi-

cal hospital provides a readily accessible means of a medical support.

7–18. Medical Support of Waterborne Operations

a. The Army commander provides medical service for all elements of a waterborne force operating away from the land or afloat base. One ATC, staffed by medical platoon personnel, serves as the battalion forward aid station. This ATC has a helipad to provide immediate evacuation by helicopter. This ATC may serve also as a troop carrier during the movement phase.

b. Patients must evacuate the battalion aid station on the ATC or the AO combat base as rapidly as possible. Air ambulance units at the artillery position, on the APB or APL, or at the airfield closest to the AO provide aeromedical support on request of battalion or brigade surgeons. Helicopters evacuate sick or wounded personnel to a hospital equipped APB, APL, or the nearest land base hospital. This hospital may be at the airfield closest to the AO (or collocated with the brigade at the land base).

c. Army assault boats, airboats, and ACV's provide a relatively fast means of evacuating casualties from platoon and company AO's to the battalion aid station. When evacuation is by boat, the evacuation sections of battalion medical platoons and the ambulance platoon of the divisional medical company man and equip the boats configured as "ambulances." The aid or clearing station is conveniently accessible from the waterway net.

(1) The assault boat may carry a doctor and medical personnel with their equipment.

(2) Depending on the type of assault boats in use, one or two litter patients can lie lengthwise in the bottom of the boat. Four additional litter patients can lie crosswise with the litter handles resting on the gunwales.

7–19. Special Considerations

a. Personal health and hygiene are particularly important for troops operating in a delta-type environment. The high incidence of malaria, cholera, plague, tuberculosis, diarrhea, and louseborne diseases among the local population requires that all personnel be thoroughly indoctrinated in disease prevention.

b. Much of the surface water may be contaminated; all water from nonapproved sources is tested and, if necessary, treated.

c. Prolonged exposure in water and improper foot care often result in immersion foot or fungus infection of the feet. About 3 days is the maximum that an individual can operate effectively in swamps and inundated paddies before suffering immersion foot, even when he massages his feet and changes to dry socks frequently. An adhesive silicone ointment, which acts as a waterproofing agent and slows the absorption of water through layers of skin, can help prevent immersion foot. Rubbing alcohol or cocoa butter, used as a field expedient, can prevent foot skin from cracking.

d. In many regions, mosquitoes and biting flies are particularly numerous along waterways and in swamp and delta areas. Therefore, adequate insect repellant is available for application to skin and clothing. Amounts needed may be in excess of those required for ordinary operations. Insect bites and open sores become infected quickly in the dirty, salty water found in many parts of a riverine area. Adequate provisions are made for personal hygiene and treatment of infected insect bites, cuts, and scratches.

e. Bloodsucking leeches infest fresh-water ditches, streams, and rivers in most portions of tropical Asia. As long as the uniform is intact and worn properly, i.e., sleeves down, jacket buttoned, and trousers tucked inside boots, aquatic leeches cannot reach the skin. However, when personnel go ashore in swamp or jungle areas, they treat their uniforms with insect repellant and apply either leech repellant or ordinary insect repellant to their skin as a protection against land leeches. The untreated uniform does not give adequate protection against these pests, which are abundant in some areas.

Section V. MILITARY POLICE

7–20. General

a. Military police support in riverine operations involves increased considerations in the functional areas of traffic control, prisoner of war (PW) and refugee operations, and security of critical areas and supplies. Additionally, support in populace and resources control be-

comes important because of the semi-independent nature of riverine operations.

b. Military police resources organic to the division may be insufficient to provide the necessary support; therefore, plans for augmentation are necessary. The riverine force commander normally retains this augmentation under his direct control.

7–21. Traffic Control

a. Traffic control, a military police function, is important in riverine operations because the generally poor road network and numerous small canals hinder combat and combat support elements as they traverse the riverine area. Continuous boat traffic on navigable waterways presents additional requirements for traffic control and may also require special military police support.

b. Traffic control in a riverine area follows the basic principles applied to river-crossing and amphibious operations and the general guidance enumerated in FM 19–25 with the exceptions that—

(1) Flexibility is necessary because of the greater frequency of water obstacles and the generally poor trafficability of the area.

(2) Greater decentralization may be necessary because of the wider dispersion of combat elements.

(3) Greater than normal resources may have to be assigned to the control of refugee traffic.

(4) Military police elements use patrol river boats (PBR) and amphibious vehicles to provide mobility on the network of waterways in the AO.

(5) The integration of military police elements in advance, flank, and rear guards of water convoys assists them in clearing civilian boats from waterways and inspecting boats when necessary.

7–22. PW Operations

a. The processing and handling of enemy PW's conform to the principles and procedures outlined in FM 19–40.

b. Planning for PW evacuation includes a detailed study of transportation used in the operation with special attention to the boat traffic plan. Use of the multiplicity of transportation available in a riverine area increases flexibility and expedites the early evacuation of PW's from the AO.

c. An increased number of civilian detainees may require special considerations for segregation and increased coordination with civil affairs personnel.

d. The control and the handling of repatriates receive special consideration. Treatment is oriented toward early rehabilitation.

7–23. Security Operations

a. Military police security operations orient on populace and resource control with special consideration to environmental restrictions.

b. Security operations require advance and continuous coordination with civilian police to restrict indigenous persons from the base area and to control their movement throughout the AO.

c. Afloat base security involves consideration of a special traffic plan on the waterways and the use of river curfews and control points for civilian river traffic.

d. Additional considerations are the use of boat patrols to secure LOC and the use of military police on supply vessels to provide added security.

CHAPTER 8
DEFENSE OF BASE AREAS

Section I. GENERAL

8–1. Mission

The mission of units defending base areas in the riverine environment is to maintain a secure base from which to support and conduct offensive operations by preventing or disrupting enemy attacks by use of fire, close combat, and counterattack.

8–2. Concept

As the initial phase of a riverine campaign, river patrols and ground operations gain local control of the inland waterways and existing road nets in areas selected for either land or afloat bases. These operations deny use of the waterways and roads as lines of communications (LOC) for enemy forces that threaten the base area or future operations. Operations to maintain a secure base continue for the duration of the riverine campaign. This chapter describes tactics and techniques for the defense of these semipermanent installations.

Section II. FUNDAMENTALS OF BASE AREA DEFENSE

8–3. Basic Considerations

The defense of land and afloat bases, established to provide all-round security for the base with a minimum expenditure of available forces, requires detailed planning and centralized control. Security measures are necessary to safeguard troops, installations, and equipment. They may also protect adjacent key civilian communities or communications centers when feasible. The defense of a base area, both aggressive and offensive, prevents the buildup of enemy forces. The characteristics, capabilities, and weaknesses of the enemy force require constant evaluation. Vigilance and sound security measures not only reduce enemy interference with operations from the base, but may cause enemy forces to divert their operations from the base area. Planners consider the following fundamentals when planning and organizing the base area defense:

a. Use of Terrain. When planning the defense, evaluation and organization of the area are essential to reduce the number of forces required for base defense. Factors considered in selecting the base location are—

(1) Artificial obstacles that improve the natural defensive characteristics of the terrain.

(2) Existing roads, rivers, and canals used for military LOC and civilian commerce.

(3) Control of land areas surrounding the base complex to a range beyond that of enemy mortars and rockets as well as control of water approaches.

(4) The use of rivers and canals as obstacles.

b. Security. Early warning of pending enemy actions insures the base commander time to react to any threat. Outposts, patrols, ground surveillance and countermortar radar, scout dogs, and air reconnaissance and surveillance provide the required early warning. Civilian informants and the actions of natives near the base area are excellent indicators of pending enemy actions. Security measures vary in degree with enemy threat, forces available, and other factors; however, constant all-round security is essential.

c. Mutual Support. The positioning of defense forces insures mutual employment of defensive resources, which include fires, observation, and maneuver elements. The capability of providing mutual support between defensive elements requires careful planning and positioning because of the circular aspects of the defensive area. The commander employs surveillance, obstacles, prearranged fires, and maneuver elements to exploit or reinforce fires to control gaps in defensive positions. Defense plans provide for use of all available support including armed helicopters and close air support.

d. All-Round Defense. In defensive planning, the base commander prepares to defend against an enemy attack from any direction. Plans are sufficiently flexible and reserves are positioned to permit reaction to any threat. The commander commits maneuver forces and available supporting weapons to detect, engage, and destroy any enemy force near the base. All personnel within the base area are assigned positions and sectors of responsibility.

e. Defense in Depth. The size of the base area dictates the degree of defense in depth. Alternate and supplementary positions, combat outposts, and mutually supporting strongpoints forward of the base forward defense area can increase the depth. The commander also plans fires throughout the defensive area up to the maximum range of available weapons.

f. Responsiveness. Attacks against a base area may range from long-range sniper, mortar, or rocket fire to attacks by suicide demolition squads or major forces. The enemy has the advantage of deciding when, where, and with what force he will attack. The defender positions his forces and plans fires and movement to meet the widest possible range of contingencies. The defender prepares plans, to include counterattack plans; and he practices, evaluates, and revises them as necessary.

g. Maximum Use of Offensive Action. Since the mission of the base defense is to maintain a secure base, the defender uses offensive action to the maximum to engage enemy forces forward of the base area. On initial occupation of the base site, friendly forces use offensive actions to destroy enemy forces in the immediate area. Once the defensive area is clear, a small force continues offensive actions in defending the base, thereby releasing other forces for offensive operations away from the base. These offensive actions consist of aggressive patrols to detect an enemy force attempting to reenter the area and provisions for conducting raids, ambushes, air attacks, and supporting fires to destroy an enemy force that has successfully reestablished itself in the area.

h. Dispersion. Dispersion is hard to maintain in base areas. The use of outposts and strongpoints to strengthen defenses provides dispersion as a side benefit. To compensate for lack of dispersion, routine base security measures change frequently to prevent the enemy force from obtaining detailed information about locations, composition, and habits of defense elements needed for the enemy to plan an attack.

i. Time Available. In formulating his defense plan, the base commander considers the time available to prepare defensive positions. Careful selection and precise timing of tasks are prerequisite to the successful defense. Defensive planning and improvement of positions continue during the occupation of the base.

j. Integrated and Coordinated Defensive Measures.

(1) *Fire planning.* Maneuver and coordinated fires are the principal means to defeat an enemy assault forward of the defensive position or within it. Fires of all weapons of attached and supporting units, including weapons of Navy ships and afloat base craft, inflict maximum casualties on the attacking forces.

(2) *Barrier plans.* Terrain features, some of them obstacles in themselves, defended and tied in with obstacles provide an effective defense. Canals and streams, for example, may be obstacles in base area defense. Fires cover all obstacles tied in with defensive positions.

(3) *Defense against swimmers and saboteurs.* Swimmers and saboteurs usually attack specific and important targets such as a boat, communications center, supply point, or aircraft. Host country civil police, military, and paramilitary forces supplement local security elements in defending against this threat. Centralization of the equipment in one sector of the base area reduces the vulnerability and increases security.

8–4. Base Defense Areas

a. A base defense (fig. 8–1) contains a base area, a forward defense area, and a reconnaissance and surveillance area. Defense elements in these areas vary in composition and strength as the specific mission, capabilities of enemy forces, terrain, location and size of the base area, and the strength and capabilities of troops available dictate.

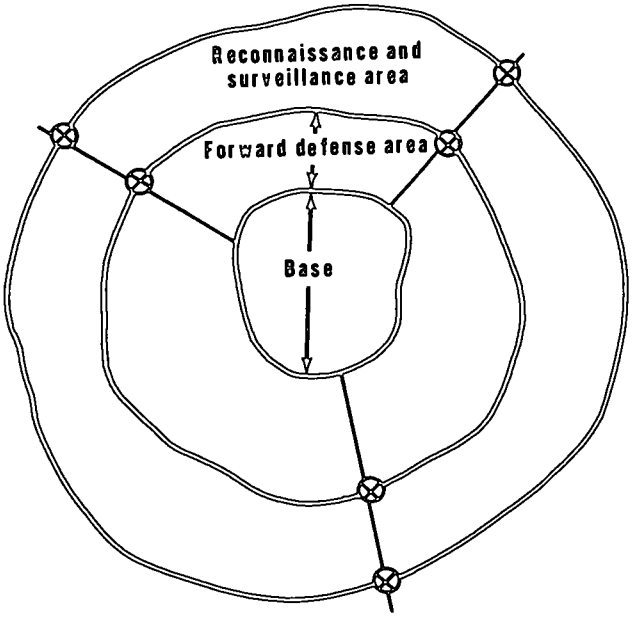


Figure 8–1. Defensive areas—circular base defense.

(1) *Base area.* For both land and afloat bases, those individuals not employed in the reconnaissance and surveillance and forward defense areas are assigned positions and sectors of responsibility within the base. In addition, all friendly forces in the surrounding area may be considered as possible base reserve forces. Because the use of ambush tactics against reaction forces outside the base is probable, the cautious employment of reserve forces is necessary.

(2) *Forward defense area.* Within this area, defensive forces repel and destroy the enemy force and prevent its entering the base area or destroying the base. The forward defense force requires defense capabilities commensurate with enemy attack capabilities. For a brigade-size base, defense forces in the forward defense area deploy in one of the following ways:

(*a*) One battalion from the brigade for the entire defensive area. This method provides excellent unity of command, but reduces the combat strength available to the brigade for offensive operations.

(*b*) One company-size element from each battalion employed in each of three battalion sectors. This method allows each battalion commander to determine the forces and weapons to remain behind and designates battalion sectors for each battalion when it is in the base area. Unity of command is not as good as in method (*a*) above, but it provides more combat forces for offensive operations.

(*c*) Support personnel and troops not actually engaged in combat and weapons not required for the combat mission defend the base. This method releases the greatest number of troops for offensive combat, but does not provide for combat troops to defend the base area. Organizing the base area into sectors and designating sector commanders who employ all units and troops in their sectors provide unity of command. Communications are necessary for each sector, and a base defense command and control center is required.

(3) *Reconnaissance and surveillance area.* The reconnaissance and surveillance area extends forward from the forward defense area to the limit of employment of security elements. These elements are far enough forward to provide timely warning of the enemy's approach; to deny the enemy direct fire into the base area; and, if possible, to deny the enemy observed mortar fire into the base area. Security elements also prevent unrestricted observation of the base area and the undetected assembly of enemy forces within striking distance of the base. The organization of the security elements provides an appropriate balance of available combined arms, supported by fires from attached or supporting units.

b. The base area tactical operations center (TOC) controls fire and maneuver and integrates the two into an effective defense. Representatives from the artillery, tactical air, Army aviation, and naval fire support elements and host country and other friendly forces in the local area are present in a fire support coordination center (FSCC). Also, U.S. liaison is necessary with the host country sector operations and intelligence coordination center (SOICC), preferably through assigned U.S.

advisors, and combat support coordination center (CSCC). Close coordination is necessary because of the population density in most riverine environments.

Section III. PLANNING AND ORGANIZING THE BASE DEFENSE

8–5. Planning the Base Defense

a. The fundamentals of defense are the bases for planning the base defense. The normal defense planning sequence provides steps in planning the base defense. The base commander considers the terrain and plans maximum use of available resources in accomplishment of the assigned mission. Planners develop both the maneuver and the fire support plans concurrently and integrate them to insure maximum use of available resources. Defensive planning is continuous. Contingency planning and planning to implement alternate plans are concurrent with the preparation of the basic plan. Plans are simple and flexible, and their execution depends on the size and capabilities of forces present in the base area at any given time.

b. Commanders, assisted by their staffs, conduct a detailed reconnaissance of the area on foot or by vehicle, boat, or air. On the basis of reconnaissance and other available information, they analyze the defensive area to determine which canals, rivers, or wooded areas require control. The defense covers all likely avenues of enemy approach.

c. The commander considers the following defense measures:

(1) Use of aviation and reconnaissance units to provide early warning.

(2) Obstacles and barriers.

(3) Defense against guerrillas, sabotage, infiltration, suicide demolition squads, and swimmers.

(4) Defense during reduced visibility.

(5) Security or control of the civilian population near the base area.

(6) Defense against waterborne attacks.

(7) Defense against mortar, recoilless rifle, and rocket attacks.

(8) Use of weapons not required by units conducting operations away from the base area.

(9) Use of support personnel not normally organized into combat operational units.

(10) Employment of tactical air and naval fire support.

(11) Use of mortars and artillery in an indirect as well as a direct fire role covering avenues of approach.

d. On initial occupation of the base, the commander devotes considerable combat power to base defense. The attitude of civilians in the immediate area; the proximity of cities and towns; the location of host country forces, both military and paramilitary; and intelligence indications of enemy activities are considerations to reduce the size of base defense forces as the surrounding area becomes secure. Support forces housed in the base area provide their own interior guard.

8–6. Frontage and Depth

Frontage and depth depend primarily on the size of the base and the security in the area. Larger frontages can be assigned when bases are established in a secure area.

8–7. Other Security Measures

a. The base commander determines the additional security measures employed—electronic surveillance devices, infrared equipment, light intensification equipment, illuminants, barbed wire, antipersonnel mines, and alarm devices. When time permits and the land base is reasonably stable, commanders may order construction of a berm completely around the main defensive line to prevent flat-trajectory fire from landing in the base area. Strongpoint defensive positions are in the berm.

b. Safe lanes, provided in barriers, allow units to shift rapidly to meet threats. Commanders consider the location of defensive positions and the effect that barriers have on the mobility of friendly forces, particularly in the counterattack. Forward elements prepare, control, and fire exploding flame devices, flame expedients, and illuminants to create obstacles.

8–8. Control Measures

Control measures used in defense of a base area are the same as those used in other defensive plans. The use of boundaries and co-

ordination points establishes defensive sectors and fixes unit responsibilities.

8–9. Organizing the Base Defense

a. The commander in a riverine area may plan and conduct a movement to a base area, conduct operations to secure the area, and establish the defense of the base all at the same time. The organization of the land or afloat base area begins as soon as troops arrive in the area and continues for the duration of the base. Adequate defense against attack is necessary during all stages of organization of the defensive position.

b. When units arrive on position, they immediately start preparing the base defense. The base commander establishes priorities of tasks in preparation of the position. FM 7–11 contains a recommended sequence of tasks.

Section IV. DEFENSE OF THE AFLOAT BASE

8–10. General

a. The afloat base area (fig. 8–2), must be relatively secure before the barracks ships arrive. There must be sufficient room to moor the afloat base and provide suitable artillery positions for adequate fire support.

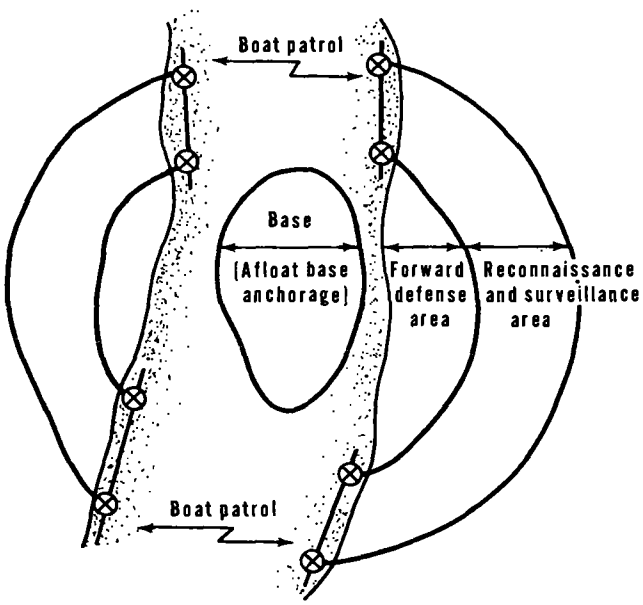


Figure 8–2. Afloat base defense.

b. The Navy commander provides support to the afloat base commander in the defense by providing fire support and assisting in security measures taken against waterborne threats. The afloat base ships are subject to a variety of waterborne threats, such as swimmers using limpet-type mines, drifting contact mines, suicide attack boats, or boats loaded with explosives. Boat patrols, integrated into the defense plan, protect against waterborne threat.

c. The base commander and the Navy commander jointly select the specific location of the afloat base. Factors considered in selecting a base location include—

(1) Proximity to the ara of operations (AO).

(2) Relative security of the area, including proximity to friendly forces.

(3) Proximity to suitable sites for emplacement of barge-mounted or land-based artillery.

(4) Proximity to an airstrip or suitable helicopter landing zone for parking transient aircraft and mounting airmobile reaction forces.

(5) Sufficient room to moor the ships and craft of the afloat base without impeding the normal flow of host country commercial and military water traffic.

(6) The effect of the local population on the deployment of an adequate defensive screen on the riverbanks and the employment of effective defensive fires.

d. Forces sent ahead initiate base security operations prior to the arrival of the afloat base. These operations include minesweeping of the anchorage, an initial sweep of the adjacent riverbanks, and initial measures to control civilian water traffic.

e. When hydrographic conditions permit, the base periodically moves a few kilometers within the selected anchorage area to present the enemy with a more difficult targeting problem for rocket, mortar, or recoilless rifle attack.

8–11. Planning

a. The afloat base is subject to a variety of threats from both the water and the surrounding land areas.

(1) Waterborne threats include swimmers, mines (command-detonated, contact, or drifting), swimmers using limpet-type mines, suicide attack boats, boats loaded with explosives, and boats mounting large-caliber weapons.

(2) Threats from the surrounding land areas include rockets, mortars, recoilless rifles, and automatic weapons, as well as sniper fire.

b. In coordination with the Navy commander, the afloat base commander, considers the following factors in preparing the defensive plan:

(1) Selection of defense forces, considering the congestion of personnel aboard ship and vulnerability of the afloat base.

(2) Integration of all weapons of the Navy element into a coordinated fire support plan.

(3) Use of surveillance equipment and countermortar radar.

(4) Use of nets, booms, sonar, and other Navy equipment, if available.

(5) Enforcement of a river curfew; and during noncurfew hours, conduct of boat patrols to control host country civilian and military traffic in the afloat base area and to detect and destroy waterborne attacks.

(6) Formulation of contingency plans for use when tide, current, or weather have an effect on the defense of the afloat base or on future operations.

(7) Designation of reaction forces, both Army and Navy.

(8) Designation of a command ship afloat, or a TOC ashore, to serve as the base defense control center.

(9) Employment of boat patrols to secure LOC. This mission requires joint forces to operate on a continuing or periodic basis to achieve and maintain dominance of designated water routes. Army elements may operate either in conjunction with or attached to Navy elements. For example, elements of the division armored cavalry squadron and river assault squadron (RAS) boats may conduct continuing combat patrols on the waterways. The habitual association of a reconnaissance unit with an RAS element provides a highly effective force.

(10) Imposition of blackout or use of lights to illuminate waterlines as a defense against swimmers.

(11) Use of spotlights by patrol boats to detect and identify water traffic.

c. Ship crews may require augmentation by Army personnel for sentries (watch standers). Special duties for all personnel embarked will be incorporated into the naval general quarters plan (alert plan). Army personnel receive briefings on—

(1) The location of friendly ships and craft.

(2) Locations of all Army personnel during general quarters.

(3) Navy plans for darkening the ship and maintaining watertight integrity.

(4) Tide and water conditions, such as slack tides, periods of reduced visibility, and bad weather, that require imposition of strict security measures.

(5) Detection and reaction plans against swimmers and saboteurs. These plans provide specific instructions on the detection of swimmers, the approach of indigenous craft, and the use of defensive measures, such as dropping handgrenades over the sides at random and firing into floating debris.

(6) Fire discipline and control procedures for individual and crew-served weapons.

d. The afloat base defense area is normally divided into sectors, with the land sectors (riverbanks) being defended or patrolled by Army elements and the water sectors being patrolled by Navy elements.

e. A joint defense operations center is organized to coordinate and control the defense of the afloat base.

f. Each ship of the afloat base is responsible for close-in defense, to include sentries to guard against swimmers or small boat attacks.

g. An emergency relocation plan, prepared each anchorage, permits rapid relocation of the base if a significant threat develops.

Section V. DEFENSE AGAINST ENEMY MORTAR, ROCKET, AND RECOILLESS RIFLE ATTACK

8–12. General

a. When enemy forces are unable to penetrate the base area perimeter in strength, they may infiltrate mortars, rockets, and re-

coilless weapons into preplanned and prepared positions within range of the base. The enemy prepares plans to place a large volume of surprise fire on the base area to inflict heavy casualties and destroy equipment. When executed, these attacks normally last from 10 to 20 minutes, with a large number of rounds being fired. The weapons are normally exfiltrated from the area when the mission is complete or when friendly forces locate and fire on the enemy position.

b. The commander prepares a plan for aggressive action to detect the infiltration of weapons and to locate firing positions. When formulating the plan for defense against enemy mortar, rocket, and recoilless rifles, the commander considers possible firing positions, intelligence reports, indigenous personnel reports, and resources available to him for implementation of the plan. He plans aggressive action to locate and destroy the enemy and passive actions to reduce casualties and damage. The best defense against these attacks is to make them so costly in execution that the enemy considers them unworthwhile.

c. Since the establishment and maintenance of a restricted area around the base area is not always possible, aggressive countermortar and recoilless rifle fire plans are necessary. Intensive patrolling within the security area is effective in detecting infiltration. These combat patrols operate in conjunction with the outpost line. They change positions each night to prevent the enemy's planning or preparing firing positions within range of the base area. The selection of patrol sectors and outpost location does not establish a recognizable pattern.

8–13. Active Defense Measures

a. An airborne observer is one of the best active defense measures against enemy mortar, rocket, or recoilless rifle attack. Army observation aircraft, armed helicopters, or Air Force planes orbit the base area checking likely or suspected positions and noticeable changes in the terrain. When a position is discovered, they take action against the position, adjusting artillery or using their own weapons against it. The base commander evaluates the threat in relation to aircraft available when deciding whether to employ an airborne observer.

b. Countermortar radar scans the most likely direction of attack. Defense plans include preplanned fires for likely enemy firing positions, coordinated with countermortar radar operations. Artillery and mortar units execute these preplanned fires as soon as an attack begins. When radar positively locates enemy firing positions, commanders employ all available fires against them.

c. The commander plans the use of reaction forces, lifted into the area by helicopter or other available transportation to cut off the retreat of the enemy, in preparing defense plans. The reaction force avoids establishing a pattern, such as always using the same landing zone (LZ). If the enemy is aware of a pattern or if he can predict LZ, he may plan an ambush to destroy the reaction force.

8–14. Passive Defense Measures

a. Defense plans include passive defense measures within the base area. In addition, an effective psychological warfare and civic action program attempts to insure civilian cooperation. Established procedures insure evaluation of all sentry or intelligence reports indicating an attack. Preparation of positions, movement of weapons or ammunition, unusual actions or movement of the civilian population, and reports by indigenous personnel may be indications of enemy attack.

b. Passive defense measures include—

(1) Dispersing personnel and valuable equipment, such as aircraft or boats.

(2) Constructing revetments around parking, docking, or storage areas.

(3) Constructing primary and alternate positions.

(4) Preparing individual protective emplacements.

(5) Varying placement of sentries; random use of patrols on foot or by vehicle or boats, incorporated with the use of scout dogs.

(6) Employing positive screening and search procedures for personnel entering or exiting the base area.

(7) Maintaining proper radio and telephone procedures.

(8) Controlling the movement of vehicles, boats, and personnel.

(9) Making periodic relocation within the general area.

(10) Using an aircraft for radio retransmission when antenna systems are inoperative.

CHAPTER 9
CIVIL AFFAIRS

Section I. GENERAL

9–1. Civil Affairs Operations

a. Civil affairs is a command responsibility. Civil affairs operations obtain essential civilian cooperation and support or reduce civilian interference with the attainment of the military objective. These operations influence the relationship between the military forces and the civil authorities and people. Civil affairs operations may require military forces to perform some or all functions that the government normally performs. See FM 31–23, FM 41–5, and FM 41–10.

b. Military civic action is a major activity of the civil affairs effort in a riverine environment. Military or paramilitary forces use their military skills, equipment, and resources in economic and sociological projects that are useful to the local population at all levels. Projects may be in such fields as education, training, public works, agriculture, transportation, communications, health, and sanitation. Military civic action programs are performed in cooperation with or in behalf of host country civil authorities.

c. Populace and resources controls are major activities of the civil affairs effort. These two related civil affairs operational programs exist concurrently, separately, or in mutual support of each other. Populace controls are measures that the civil or military authority institutes to mobilize human resources for the government and to deny these resources to the enemy. Resources controls are measures to identify those material items required by the enemy and to deny their diversion to the enemy, or to deny his acquisition thereof. These controls have overlapping effects.

d. Consolidation psychological operations are of major importance to the civil affairs effort. These psychological operations (PSYOP) involve all forms of propaganda to influence the behavior of neutral or friendly groups and to support civil affairs programs designed to gain their support. Mostly, the individual soldier's participation in this area falls under the heading of civil-military relations—another improtant aspect of civil affairs.

9–2. Civil-Military Relations

a. Any military organization stationed within or in proximity to a civilian populace exerts influence on it. This influence contributes to the attainment of political and military goals or detracts from it in almost direct proportion to the success or failure of the civil-military relations program that military commanders institute. Civil-military relations become more critical when military forces are in foreign lands at the invitation of a host country.

b. Civil affairs operations are an important military factor in areas with a rural agrarian society and include both personal and organizational contacts. Development and stabilization of agricultural and fishing areas, which may be the economic base of the entire country, are absolutely essential. The securing of land or air routes, in addition to water routes obstructed by hostilities, for transportation of rice or other agriculture products to market, becomes important to the local population which depends on income from sale of such products. The totality of civil-military relations, therefore, directly impacts on operations and affects courses of action that the commander consider. FM 41–10 provides detailed information on the most important as-

pects of a well-integrated civil affairs program. Succeeding sections contain guidance applicable to internal defense and internal development in riverine areas.

Section II. MILITARY CIVIC ACTION

9–3. Purpose

During division operations, brigades and battalions participating in military civic action contribute to the economic and social development of the population. This contribution is to improve the environment and the standing of host country and allied armed forces in the area and to win the cooperation of the local inhabitants.

9–4. Coordination and Direction

a. Whether the activities are centrally directed or voluntary, the goals are similar. Military civic action activities are coordinated among all staff sections, as well as with other action agencies (Agency for International Development (AID), U.S. military advisors, and local political and military officials), to avoid duplication of effort and prevent depletion of resources on projects that do not contribute to the overall objective. This coordination insures most efficient use of skills, labor, supplies, equipment, and funds involved and the continuation of programs.

b. Directed activities usually involve specific assignments, central funding, and authorization to use military resources. These activities in riverine operations are usually in the vicinity of base areas.

c. Voluntary activities take place in both base areas and operational areas. They follow general guidelines from higher headquarters and the host government. These activities require greater initiative and resourcefulness at the lower unit level than the directed activities. The major effort is toward encouraging, guiding, and supporting self-help programs. Directives to subordinate units encourage such activities, provide program guidelines, and authorize the use of equipment and facilities for these purposes. Motivation of the local military or paramilitary forces to assist in civic action is easier if the living conditions of local forces and their dependents improve, either prior to or concurrently with projects for the civilian population.

9–5. Concept

In the base area, military civic action planning emphasizes assistance, guidance, and initiation of self-help programs possible with available resources. Advisors and local officials coordinate all military civic actions to obtain approval prior to implementation. The brigade or battalion civil affairs officer coordinates with the division G5 for approval of projects. In independent operations, the brigade or battalion civil affairs officer coordinates with the civilian or military equivalent agency—diplomatic mission, AID representative, and international or multinational nonprofit organizations. He also determines the availability of specialists, teams, or individuals with appropriate technical skills from civil affairs, engineer, medical, maintenance, transportation, signal, and aviation units. Considerations in designing a successful military civic action program follow:

a. The political, economic, and sociological background of the people.

b. The establishment of priorities for the most critical projects, considering national internal development plans.

c. The capabilities of the brigades and battalions, technical skills available, time, and available equipment.

d. The desires of the local population.

e. The availability of local labor. Local people provide labor for projects as much as possible. Benefits decrease when too few people are in the area or when U.S. troops do all or most of the work. Timing of projects is extremely important. Local workmen may not be enthusiastic about building a new school during the harvest or planting season.

f. The majority of the people benefit from the projects.

g. A willingness to accept responsibility for project maintenance after completion of the project. This requires coordination with host country forces in the area.

h. The fact that projects do not assist citizens of questionable loyalty to achieve a

higher living standard or political status than loyal citizens.

i. An understanding by both local people and U.S. personnel of the basic reasoning behind projects. Projects to develop a clean water supply may fail if the people do not realize the need for clean water. If the local people do not understand that rats carry disease, then they have no interest in rodent control. (See FM 41–10 for types of projects and types of units that logically can accomplish them.)

j. The necessary exercise of caution to avoid becoming involved with longe-range projects, especially those in which U.S. units are sole sponsors. Priority is given to short range or immediate impact civic action projects, such as—

(1) Medical and dental treatment.
(2) Distribution of relief supplies.
(3) Distribution of candy, tobacco, cooking oil, and school and sewing supplies.
(4) Minor repair to community buildings, dispensaries, schools, and churches or temples.
(5) Minor repairs to roads, canals, bridges, dikes, culverts, and drainage systems.
(6) Sanitation projects—clearing ditches and insect and rodent control.

k. The possibility of longer range projects in the area surrounding the base, which, because of the permanency of the base, can contribute to civic development.

l. Opportunities, in both short- and long-duration projects, for education and training of local people in technical and nontechnical areas.

m. The psychological and intelligence benefits to be gained from providing language training to U.S. personnel engaged in civic action projects.

Section III. POPULACE AND RESOURCES CONTROL

9–6. Concept

Host country agencies conduct populace and resources control programs. U.S. units normally assist host country government agencies in these programs. U.S. participation ranges from minor support in the area of operations (AO) to complete control in a base area. These controls are extremely difficult for U.S. personnel to impose. Commanders maintain the framework and authority of the local government, when possible, to avoid alienating the population. U.S. troops assist local authorities when they are in danger of losing control and host country military forces are not available or are ineffective. Populace and resources controls assist base security and offensive operations. Populace and resources controls are part of both the internal defense and internal development programs and assist in the achievement of host country national objectives.

9–7. Planning and Direction

a. Unit civil affairs staff officers (G5/S5) accomplish planning and staff supervision for those aspects of populace and resources control for which the divisional units may have responsibility. Close coordination with assigned or supporting military and civil police resources is essential. The control necessary, the identification of type and number of people and resources to be controlled, the limitation of authority, and the desire of local authorities to establish necessary controls are the bases for brigade and battalion planning. Operation orders contain a civil affairs annex to prescribe populace and resources control measures. Host country authorities provide information on the populace and resources control plan as well as information or policy on confiscation and disposition of commodities such as salt, medical supplies, and chemicals of an explosive nature.

b. U.S. programs attempt to isolate the enemy from the population and resources in the AO or a base area and assist in mobilizing those assets for the host country government. The specific objectives of populace and resources control are—

(1) To deny the enemy support from the local population.
(2) To detect and neutralize the enemy infrastructure and activities in the base area and the AO.
(3) To assist in the provision of a secure physical and psychological environment for the population.

(4) To assist in mobilizing material and human resources on behalf of the government.

c. The control imposed on the population depends on their cooperation in the base area or AO. Imposing rigid controls on a village that collaborates with the enemy may be necessary. The control measures established are a joint military/civilian effort and may include—

(1) Checkpoint and patrol operations.

(2) Search operations in populated areas.

(3) Surveillance of populated areas.

(4) Detention of enemy sympathizers or village militia.

(5) Prevention of illegal political meetings and rallies.

(6) Registration and documentation of all civilians, vessels, and vehicles.

(7) Inspection of individual identification documents, permits, and passes.

(8) Restrictions on public and private land and water transportation and communication means.

(9) Curfew.

(10) Censorship.

(11) Control of production, storage, and distribution of food and protection for food-producing areas.

(12) Control of the possession of arms, ammunition, demolitions, drugs, and medicine.

(13) Evacuation of areas when required.

d. U.S. troops normally require special training to recognize or identify contraband and controlled or critical items. Brigade and battalion forces screening an area or manning checkpoints require the ability to identify a variety of critical items. An extensive list of chemicals, medicines, fertilizers, machines, and equipment may be subject to government regulation, for example—

(1) Potassium chlorate and arsenic sulphide, when combined, form an explosive. Civilians possessing such combinations are suspect.

(2) Blacksmith equipment or a concentration of machinery and medicines may appear harmless. However, this material alerts U.S. personnel to the possibility that there may be a well-camouflaged enemy base in the area.

(3) Unusual amounts of medicine found in a house or a concentration of sewing machines. Caution should be exercised because the medicine may be insulin required by a diabetic or the concentration of sewing machines may be a licensed tailor shop.

9–8. Execution of Populace and Resources Control Measures

a. The populace and resources control aspects of base security and offensive operations are important. Although the use of local government personnel, with U.S. Forces as a reserve, to enforce populace and resources control measures is desirable, the host country may not be able to provide enough qualified personnel to accompany U.S. units conducting operations. Agreements establishing limits of U.S. detention authority are made locally.

b. When conducting checkpoint operations, the commander considers the following:

(1) Checkpoint operations are normally used to control civilian movements, to confiscate illegal goods, to apprehend enemy sympathizers, and to check the adequacy of such other controls as identification passes and travel and fishing permits. U.S. Forces train and rehearse the establishment of surprise checkpoints. Host country military or civil police representatives, when available, search and inspect.

(2) Normally, units establish checkpoints where there is sufficient space to assemble people under guard and to moor boats and park vehicles for search and investigation. Sufficient troops are near the checkpoint to apprehend vehicles, boats, and individuals attempting to avoid the checkpoint and to provide fire support. Local security elements are necessary to protect the checkpoint.

(3) Processing of individuals, vehicles, and boats at the checkpoint is as rapid and efficient as possible. Personnel conducting searches are impersonal, but thorough.

c. Search operations are conducted to search watercraft and inhabited areas; apprehend enemy personnel; and seize illegal arms, communication means, medicines, and other controlled items.

d. In rich food-producing areas, depriving enemy forces of food is difficult. Offensive operations may uncover large stores of rice or salt. Unwarranted destruction of these commodi-

ties, though it deprives enemy forces of food, could alienate many civilians and make them enemy sympathizers.

(1) When possible, units transport rice and salt to areas under friendly control. These commodities are available for refugees or displaced persons or for a civic action food program in areas where food is scarce.

(2) Ponchos or canvas placed in cargo beds of vehicles, boats, and aircraft prevent bulk rice and salt from dropping through crevices into moving parts. Rice and salt are kept covered during transport to prevent water damage.

(3) If rice and salt cannot be moved and must be destroyed, spoilage kits are available. Local host country governmental and military officials determine disposition. The following are some effective methods of destruction:

(*a*) Spreading on the ground and wetting down with water.

(*b*) Chemical burning with JP–4 diesel fuel.

(*c*) Burning, using tar to ignite.

(*d*) Dumping in rivers, streams, or wells.

(*e*) Using charges or available handtools to scatter over a large area.

(4) Large stores of rice and salt are not always an indication that the local population is supporting enemy forces. Local government officials inform U.S. units of the amount of rice authorized per person per family. The confiscation of rice and salt from a family may deprive some enemy forces of food, but may also alienate a great many civilians and make them enemy sympathizers.

(5) The movement of large stores of captured rice from the combat area is usually a difficult operation for the tactical unit, and usually conflicts with their primary mission. Therefore, high headquarters must be prepared to make a timely decision on whether to continue with the tactical operation or whether to degrade it by expending the manpower and logistical resources for the movement of the rice.

e. In riverine areas, fishing normally is the chief livelihood for a number of people. Fishing operations may range from organized businesses employing small fleets, processing areas, markets, and other facilities to single units or devices to satisfy immediate family needs. Enemy forces may exploit the fishermen, much like the farmers, to supply a portion of their basic food needs. Plans for surveying food items in the AO include control of the fish harvest. On discovery of bulk supplies of fish or fish products in enemy areas, U.S. units normally move these supplies to areas under friendly control. Investigation of these supplies is thorough to insure that their removal does not cause hunger or hardship among civilians remaining in the area. Fishing operations in contested or neutral areas pose other significant civil affairs problems that U.S. units recognize and deal with appropriately.

(1) Curfew hours must be realistic. Fishing operations normally require a fisherman to depart in early morning hours to reach the best fishing areas. Such things as tide and tide tables also are considered. Ignoring these considerations may force a fisherman to choose between a reduced harvest or violating the curfew.

(2) Distinguishing between a legitimate fishing operation and a military movement disguised as a fishing operation is difficult. In remote or fringe areas where establishment of checkpoints is difficult, waterborne forces may control the movement of fishing craft. Air surveillance provides an excellent means of checking the flow of traffic; but, with the exception of amphibious aircraft, physical examination of the watercraft is not possible. Use of air surveillance and waterborne forces jointly provides an ideal solution.

(3) The enemy may force fishermen to transport enemy forces and materiel. Unarmed vessels are defenseless against this impressment and unfortunately will, in most cases, be treated as enemy when apprehended. Claims of impressed service by the apprehended fishermen warrant detailed investigation. In all cases, local government officials determine guilt or innocence.

9–9. Control of Refugees, Evacuees, and Displaced Persons

a. When preparing plans, commanders consider evacuees, displaced persons, and refugees as one group. Host country officials, U.S. advisors, and representatives of U.S. agencies such as AID have responsibilities in this area

and prepare plans to solve problems, to include the logistical support required to handlc displaced persons (e.g., transportation, food, shelter, sanitation, and water). If other officials or agencies are not present or are not able to handle a situation, U.S. commanders assist in handling refugees or assume control.

b. The commander makes every effort to plan and conduct tactical operations so that civilians unavoidably involved in the operational area will react favorably. Their treatment during initial contact with friendly forces may well decide their final allegiance. A well-planned, well-coordinated, business-like manner is necessary when administrating to the needs of refugees. Humane, just, and efficient handling of refugees, evacuees and displaced persons improves the cooperation and rapport between the local people and the host country and U.S. Forces.

c. Five major steps involved in the care and handling of civilians in large numbers are—

(1) Collection to facilitate control.

(2) Assembly in a specific area.

(3) Evacuation from the operational area.

(4) Provision of minimum essential housing, food, clothing, and medical treatment.

(5) Return to or resettlement in their home areas when operations end.

d. The advantages of establishing refugee centers are—

(1) Provision of an opportunity to friendly forces to demonstrate their concern for the welfare of the people. This tends to increase popular support.

(2) More efficient administration and provision of basic necessities.

(3) Prevention of destitution because individuals are not left to "shift for themselves."

e. Basic principles for direction and control of civilian movement are—

(1) Selection and coordination of evacuation routes with all agencies to prevent interference with the tactical plan.

(2) Identification of the canals, waterways, streams, roads, and trails selected. Posting in the refugees' language or using pictures or guides, provides directional information.

(3) Establishment of control and assembly points where canals, streams, waterways, roads, and trails connect.

(4) Establishment of rest areas at points of greatest congestion to care for the refugees' immediate needs.

(5) Coordination with local and national agencies in the area to expedite movement and facilitate assumption of responsibility by host country agencies.

f. Planning considerations include the following:

(1) Control point locations require adequate turnaround room for boats or vehicles.

(2) Providing transportation for refugee movement may require that local government representatives commandeer boats and vehicles. Returning assault boats and helicopter lifts may assist in refugee movement.

(3) Local police, assisted by U.S. military police, provide traffic escort, direction, and guards. Tactical units positioned along routes may assist police elements.

(4) Knowledge of the size and construction of camps required for refugee temporary occupation is necessary.

(5) The selection of sites for refugee camps near water, food supplies, and power, if possible, is necessary. Within each camp, separate facilities are necessary for—

(*a*) Different nationalities or ethnic groups.

(*b*) Family groups.

(*c*) Unattached males.

(*d*) Unattached females.

(*e*) Orphans.

(6) Local personnel accomplish camp administration when possible. Permitting refugees to retain their possessions and to speak freely to camp officials and keeping them busy with camp work and recreational activities reduce problems of camp administration. Internal leadership is important, and allowing the people to organize themselves is desirable. Leaders and committees speak for their respective groups and make suggestions or inquiries. These committees disseminate instructions and information from the camp staff.

(7) Interpreters are necessary to screen refugees.

(8) Essential medical care and sanitary facilities are necessary.

(9) AID may assist in providng essential clothing, food, shelter, and medicine.

(10) Since the refugees have limited sources of information from outside the camp, the

camp officials exploit the propaganda aspects of information provided within the camp.

(11) Liaison with other interested agencies (AID, military assistance advisory group (MAAG), International Volunteer Serivces, and host country military and governmental personnel) is paramount in refugee operations. U.S. advisors provide liaison when they are present in the area.

g. The host country may have an amnesty program. U.S. troops must become familiar with the mission and objectives of the program and provide cognizance to persons voluntarily returning to host country control.

(1) Host country amnesty programs consist of—

(*a*) Propaganda.

(*b*) Collection of ralliers and defectors.

(*c*) Education and redirection of the ralliers and defectors.

(*d*) Reincorporation of ralliers and defectors into the friendly society.

(*e*) Employment of ralliers and defectors against enemy forces.

(2) Propaganda is generally more constructive in amnesty programs than in tactical operations. It usually explains the national cause in detail. Themes employed are usually of a benevolent nature. Coordination between U.S. PSYOP efforts and the host country's amnesty program is necessary. U.S. troops controlling refugees and captured suspects require familiarity with the recognition signals of ralliers or defectors. Since the host country often rewards ralliers and defectors for the turn-in of weapons, their weapons are kept separate from other captured weapons. Expeditious handling and delivery of ralliers and defectors and their weapons to the host country agency responsible for the amnesty program are essential.

Section IV. CONSOLIDATION PSYCHOLOGICAL OPERATIONS

9–10. Purpose

a. Civil affairs operations assist in the intelligent handling of military contacts with civilians to help the commander accomplish his mission. These operations are most successful when supported by consolidation PSYOP directed toward civilians located in the unit area of responsibility.

b. Consolidation PSYOP direct propaganda toward neutral or friendly populations to promote maximum cooperation and cohesion among various factions. Tactical PSYOP generally direct propaganda toward enemy target audiences and neutral or friendly audiences under enemy control to assist in the achievement of tactical objectives.

c. A commander uses consolidation PSYOP to attain civil affairs objectives just as he uses firepower to support a plan of maneuver. Detailed doctrine for the support of civil affairs objectives by PSYOP is contained in FM 31–23 and FM 41–10. FM 33–1 and FM 33–5 contain PSYOP doctrine and techniques.

9–11. Planning and Concept

a. The G3/S3 has staff responsibility for tactical PSYOP. The G5/S5 has staff responsibility for consolidation PSYOP. The G5/S5 coordinates with G3/S3 on assignment and use of PSYOP units and personnel, and with G2/S2 on intelligence support requirements. PSYOP staff and units advise commanders concerning the psychological implications of proposed courses of action. They use organic U.S. and host country personnel and equipment to produce and disseminate propaganda in support of selected courses of action.

b. Planners consider such current factors as general attitudes and morale, information media available, and qualified technicians available. Evaluation of the effectiveness of past PSYOP and civil affairs operations is continuous and critical. Planners at division, brigade, and battalion integrate and coordinate their separate programs to emphasize the effects of the programs on various target audiences.

Section V. COMMUNITY RELATIONS AND OTHER SPECIAL CONSIDERATIONS

9–12. Purpose and Concept

a. When the U.S. force must operate close to a civil population, the commanders must develop and implement a comprehensive civil-

military relations program. The effects of poor civil-military relations may go beyond the local community and have far-reaching implications. Good relations promote better understanding between civil and military elements and encourage cooperation between the two groups.

b. Without properly oriented troops and units and a good civil-military relations program, "cultural shock" may occur among both the U.S. troops and the local population. Impressions formed at the time of U.S. entry are the strongest. A lack of consideration by U.S. troops for the social and economic environment may alienate the people and upset any balance or stability that exists in an area.

c. The individual soldier receives area-orientation through area study, troop information, and preparatory training for the specific area. A basic list of "do's" and "don't's" based on knowledge of the cultural, religious, economic, and political aspects of the area provides information for troop use. Most items listed are commonsense matters; however, presenting them formally achieves uniformity and conformity. FM 31–73 contains detailed information on this subject.

9–13. Planning, Direction, and Coordination

Civil-military relations are considerations in the initial stages of entry into foreign lands and throughout all subsequent operations. In addition to the usual considerations, civil affairs staff officers, in their planning, coordinate with appropriate staff sections and consider the following in their initial assessments and estimates:

a. Civic development and coordination groups, established with representatives of United States, local government, military, and police, promote proper understanding of local laws, policies, U.S. regulations and restrictions, and security measures and adherence to them. They also settle claims and handle civilian personnel in both the base area and the AO.

b. The procurement of local labor, properly screened for security and loyalty, is desirable to free combat troops for operational duties. The wages established, after valid investigation and consultation with local government officials and their military and civilian advisors, are in accordance with local wage scales. This coordination precedes troop saturation of the area. Wage increases may be in order when the economic level rises; however, they require coordination with other aspects of the economy. The establishment of labor and wage control boards requires further assistance from local government officials. Host country officials, when possible, process laborers, perform security checks, make payment, and process complaints.

c. Perhaps the largest single problem is the supply of potable water in a riverine area. The local people have their own traditional methods of sustaining their needs. Storing water in large crocks, for example, provides breeding places for malaria-bearing mosquitoes. This method does not meet U.S. sanitation standards. U.S. Forces do not use water from such sources. Army units can improve community relations by helping inhabitants find new and better sources of potable water if time and equipment are available.

d. The commander distributes fair price lists, based on the economy of the immediate and surrounding communities, and requires strict adherence to them.

e. Units and individuals purchase comfort and area improvement items from the local economy, such as:

(1) Ice, which usually requires transportation from the larger cities. This item can be the source of employment for many people. Civil affairs officers consider establishment of an icemaking plant in the civic development plan as a self-help, civic action project in base areas.

(2) Perishable items of food, fresh vegetables, eggs, and bread. These items also provide opportunity for increased employment, industry, and agricultural development.

(3) Lumber, cement, sand, cement blocks, bricks, tin roofing, pipe, and plumbing hardware are construction materials that may have been introduced into the area by AID.

(4) Barber, tailor, and laundry shops, planned and controlled through proper coordination with local officials and U.S. Forces, are necessary.

(5) Souvenirs become popular market items for U.S. troops. Unless controlled, the demand and the chance of quick monetary returns may lure farmers and craftsmen from their necessary trades.

9–14. Civil Affairs Operations on Initial Entry

From the standpoint of civil-military relations, the establishment of bases, both permanent and tactical, in stability operations presents problems for the commander. These problems are not insurmountable; appropriate solutions are available through imagination and enthusiasm by the commander and his staff, especially the commander's civil affairs staff officer.

a. Types of Base Camps. There are basically two types of base camps: brigade and larger semipermanent camps and battalion combat bases.

b. Establishment of Camps. Generally, base camps are in populated areas and certain general remarks apply regardless of the size of the camp.

(1) Normally, a battalion operating in a base camp away from the division base coordinates with a district chief through his U.S. military advisor, unless the battalion is located contiguous to a province headquarters. The brigade controlling the operation normally coordinates directly with the province chief through the province senior U.S. advisor.

(2) In any base camp, the decision as to whether to employ civilian labor rests with the commander. The local commander and the province or district chief agree on acceptable wages when the unit employs civilian labor. The wage must not contribute to inflation or provide unfair competition to other employers. The commander of a large base employing hundreds of civilian laborers each day may consider temporarily altering labor hire during the harvest season to prevent interference with local seasonal employers.

(3) Units survey and identify arts, monuments, and archives before moving into a new area to prevent possible damage. Troops, through command guidance, receive instruction in identification and protection of these items.

(4) Price control and a form of rationing are important aspects of civil-military relations. Normally, a district chief will be happy to prepare a price list, which, if agreed to by the U.S. commander, becomes binding on the merchants. The published price list informs all troops of the established prices in the district. Items such as soft drinks, beer, and ice require rationing because merchants sell these items on a first-come-first-served basis. The local civilians, because of the large requirements of the U.S. units, may not be able to purchase these everyday commodities. The district chief informs local merchants not to sell these items to U.S. troops until the merchants can stock a sufficient quantity to meet both civilian and U.S. military needs.

c. Semipermanent Base Camps.

(1) The civil affairs officer initially recognizes civil-military relation problems, such as establishing price lists and interpreting curfew regulations.

(2) The initial civic action endeavor provides immediate impact on the population and paves the way for the U.S. troops. Medical civic action programs with concurrent use of PSYOP to explain the U.S. presence are examples.

(3) On establishment of the camp, subordinate units assume civil affairs responsibilities, on a recurring basis, for the hamlets contiguous to the base camp. This insures continuity of effort in the civic action program.

d. Battalion Combat Base.

(1) The civil-military relations problem in establishing combat bases is the same as that in establishing a large semipermanent camp, but is of a lesser magnitude. PSYOP are essential, especially in areas with little or no local government influence to explain U.S. presence in the area.

(2) The actual area selected for the base camp is chosen with consideration to prevent crop damage.

e. Checklist for Civil Affairs on Initial Entry.

(1) This checklist is adaptable for use by civil affairs personnel who are inaugurating civil affairs/civic action in a new area. They are aware that the military requirements of the situation may prevent the accomplishment of any or all of the subsequent actions. This checklist contains two sections: one for the province and one for the district.

(*a*) *Province.*

1. Introduction, offering of support, and mutual declaration of problem areas.

2. Determination of current political boundaries.

3. Current hamlet status report.

4. Refugees:

(a) What local food stocks are on hand to support refugees, and where are they located? How can food stocks be obtained?

(b) Are medical supplies, clothing, and related items available?

(c) Where are the refugee centers, and what are their capacities?

5. Labor:

(a) What type of labor is available in the area (skilled, semiskilled, unskilled)?

(b) What is the availability of laborers in the categories listed above?

(c) Can the province and the command reach an agreement on the number of laborers available for hire with an appropriate wage scale?

(*b*) *District.*

1. Identification of local arts, monuments, and archives to safeguard from possible damage or desecration.

2. Determination of curfew exemption and travel exemptions for indigenous population. Publication of curfew and travel exemptions for U.S. troops.

3. Determination of civil information media available in the district.

4. Determination of amount of rice authorized each family.

5. Price control:

(a) Determination of current prices.

(b) Determination of whether there are items in short supply that the commander will prevent U.S. troops from purchasing.

(c) Ascertaining whether local leaders can provide assistance in stabilizing prices.

6. Determination of whether farming or other activities will interfere with military operations.

(2) This checklist is merely a guide for civil affairs officers to follow in establishing civil-military relations in a new area. It establishes the fundamentals, which, when added to rapport among U.S. military, U.S. advisors, and indigenous officials, are the initial steps toward success in establishing a unit in an area.

APPENDIX A

REFERENCES

AR 320–5	Dictionary of United States Army Terms
AR 320–50	Authorized Abbreviations and Brevity Codes
FM 1–100	Army Aviation Utilization
FM 5–25	Explosives and Demolitions
FM 6–20–1	Field Artillery Tactics
FM 6–20–2	Field Artillery Techniques
FM 6–40	Field Artillery Cannon Gunnery
FM 6–140	Field Artillery Cannon Battalions and Batteries
FM 7–11	Rifle Company, Infantry, Airborne, and Mechanized
FM 7–15	Rifle Platoon and Squads Infantry, Airborne, and Mechanized
FM 7–20	Infantry, Airborne Infantry, and Mechanized Infantry Battalions
FM 7–30	Infantry, Airborne, and Mechanized Division Brigades
FM 11–50	Signal Battalion, Armored Infantry, and Infantry Mechanized Divisions
FM 17–1	Armor Operations
FM 17–15	Tank Units, Platoon, Company, and Battalion
FM 17–36	Divisional Armored and Air Calvary Units
FM 19–25	Military Police Traffic Control
FM 19–40	Enemy Prisoners of War and Civilian Internees
FM 20–22	Vehicle Recovery Operations
FM 21–11	First Aid for Soldiers
FM 21–50	Ranger Training and Ranger Operations
FM 21–75	Combat Training of the Individual Soldier and Patrolling
FM 21–76	Survival, Evasion and Escape
(S) FM 21–77A	Joint Worldwide Evasion and Escape Manual (U)
FM 30–5	Combat Intelligence
FM 30–9	Military Intelligence Battalion, Field Army
FM 30–10	Terrain Intelligence
(C) FM 30–10A	Special Applications of Terrain Intelligence (U)
FM 30–15	Intelligence Interrogation
FM 30–16	Technical Intelligence
FM 30–17	Counterintelligence Operations
(C) FM 30–17A	Counterintelligence Special Operation (U)
(S) FM 30–18	Intelligence Collection Operations, Intelligence Corps, U.S. Army (U)
(CM) FM 30–31	Stability Operations—Intelligence (U)
(S) FM 30–31A	Stability Operations—Intelligence Collection (U)
FM 31–11	Doctrine for Amphibious Operations
FM 31–12	Army Forces in Amphibious Operations (The Landing Force)
FM 31–16	Counterguerrilla Operations
FM 31–23	Stability Operations, U.S. Army Doctrine
FM 31–30	Jungle Training and Operations

(C) FM 31–40	Tactical Cover and Deception (U)
FM 31–73	Advisor Handbook for Stability Operations
(C) FM 32–5	Signal Security (SIGSEC) (U)
(S) FM 32–10	United States Army Security Agency in Support of a Field Army (U)
(C) FM 32–20	Electronic Warfare (Ground Based) (U)
(S) FM 32–20A	Electronic Warfare (Ground Based) (U)
FM 33–1	Psychological Operations—U.S. Army Doctrine
FM 33–5	Psychological Operations—Techniques and Procedures
FM 41–5	Joint Manual for Civil Affiairs
FM 41–10	Civil Affairs Operations
FM 54–2	The Division Support Command
FM 54–3	The Field Army Support Command
FM 54–4	The Support Brigade
FM 57–1	U.S. Army/U.S. Air Force Doctrine for Airborne Operations
FM 57–35	Airmobile Operations
FM 61–100	The Division
FM 100–27	U.S. Army/U.S. Air Force Doctrine for Tactical Airlift Operations
TC 3–16	Employment of Riot Control Agents, Flame, Smoke and Herbicides in Counterguerrilla Operations
TM 5–700	Field Water Supply
JCS Pub. 1	Dictionary of United States Military Terms for Joint Usage
JCS Pub. 2	Unified Action Armed Forces (UNAAF)

APPENDIX B

REFERENCE DATA

This appendix contains a description of vehicles, craft, and equipment usable in a riverine environment. The vehicles and craft represented are not all that are available for use, but are representative of those in the current inventory of the U.S. Services, those used by host country forces in Vietnam, and those in the prototype stage.

Section I. NAVY RIVERINE EQUIPMENT AND CHARACTERISTICS

B–1. River Flotilla Equipment

a. River Support Squadron.

(1) Self-propelled barracks ship (APB).
(2) Barracks ship (nonself-propelled) (APL.)
(3) Landing craft repair ship (ARL).
(4) Tank landing ship (LST)—542 class.
(5) Tank landing ship (LST)—1156 class.
(6) Large harbor tug (YTB).
(7) Net laying ship (AN).

b. River Assault Squadron.

(1) Armored troop carrier (ATC).
(2) Refueler.
(3) Command and control boat (CCB).
(4) Monitor.
(5) Assault support patrol boat (ASPB).

B–2. Other Navy Equipment

a. Ships.

(1) Inshore fire support ship (IFS).
(2) Landing ship, medium, rocket (LSMR).

b. Craft.

(1) Patrol boat, river (PBR).
(2) Patrol craft, fast (swift) (PCF).
(3) Inflatable boat, small (IBS).
(4) Minesweeping boat (MSB).
(5) Personnel air cushion vehicle (PACV).
(6) Patrol boat (Coast Guard) (WPB).

B–3. Vietnamese Navy Ships and Craft

a. Ships.

(1) Patrol craft (PC).
(2) Patrol craft, escort (PCE).
(3) Patrol motor gunboat (PGM).
(4) Landing ship, support, large (LSSL).
(5) Landing ship, infantry, large (LSIL).
(6) Landing ship, medium (LSM).
(7) Minesweeper, coastal (MSC).

b. Craft.

(1) Landing craft, utility (LCU).
(2) Landing craft, mechanized (LCM(8)).
(3) Landing craft, vehicle/personnel (LCVP).
(4) Landing craft, vehicle/personnel (armored) (LCVP(A)).
(5) Landing craft, personnel, ramped (LCP(R)).
(6) Landing craft, mechanized, armored (LCM(A)).
(7) Commandament.
(8) Monitor.
(9) FOM/STCAN.
(10) River patrol craft (RPC).
(11) Command junk.

B–4. Descriptive Data

a. Self-Propelled Barracks Ship

(1) *General characteristics.* A converted LST of the 542 class, the self-propelled barracks ship (APB) provides mobile billeting facilities for river flotilla and Army units embarked. One ship will have command facilities suitable for a brigade headquarters.

(2) *Specific data.*

Length:	328 feet
Width:	50 feet

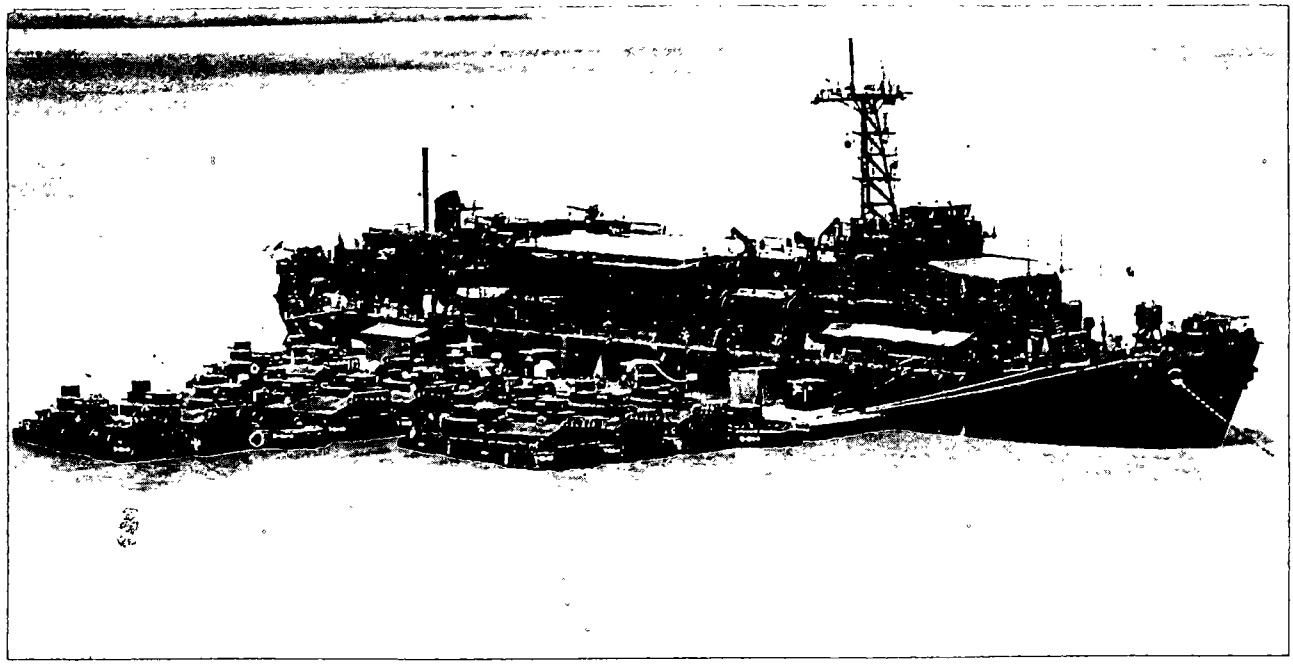


Figure B–1. Self-propelled barracks ship (APB).
(AMMI barage and watercraft moored alongside)

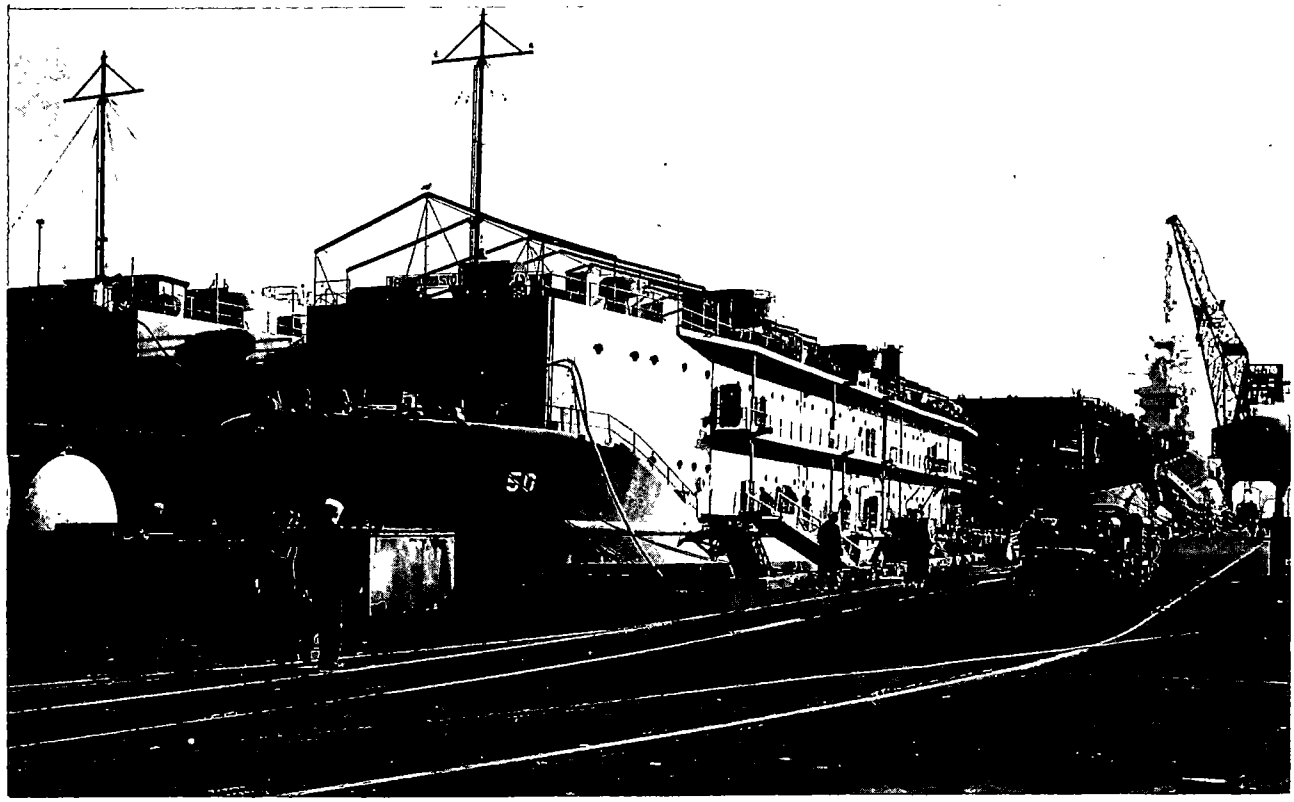


Figure B–2. Barracks ship (nonself-propelled) (APL).

Draft:	14 feet (full load)
Weight:	3,640 tons (full load)
Speed:	12 knots maximum sustained
Engines:	2 diesels
Complement:	11 officers and 123 enlisted
Capacity:	
Personnel:	55 officers and 1,034 enlisted; brigade flagship 114 officers and 899 enlisted
Fuel:	128,000 gallons
Potable water:	40,000 gallons per day
Armament:	
2 3-inch/.50 caliber rapid-fire single mounts	
2 40-mm quad mounts	
8 .50-caliber machineguns	
Armor protection:	None
Miscellaneous:	
Bow doors sealed.	
Landing platform for one helicopter.	

b. Barracks Ship (Nonself-Propelled).

(1) *General characteristics.* Barracks ships (nonself-propelled) (APL) serve the same purpose as the APB; however, they do not have the versatility of the APB because of compactness of space and lack of mobility.

(2) *Specific data.*

Length:	261 feet
Width:	49 feet
Draft:	11 feet
Weight:	2,580 tons (full load)
Capacity:	
Personnel:	35 officers and 589 enlisted
Messing:	6 officers and 200 enlisted
Potable water:	250,000 gallons
Armament:	None
Armor protection:	None
Miscellaneous:	
Electric power:	3 100-kilowatt generators
Distilling plant:	24,000 gallons per day

c. Landing Craft Repair Ship.

(1) *General characteristics.* The landing craft repair ship (ARL) is a conversion of the LST 542 class hull to provide repair facilities

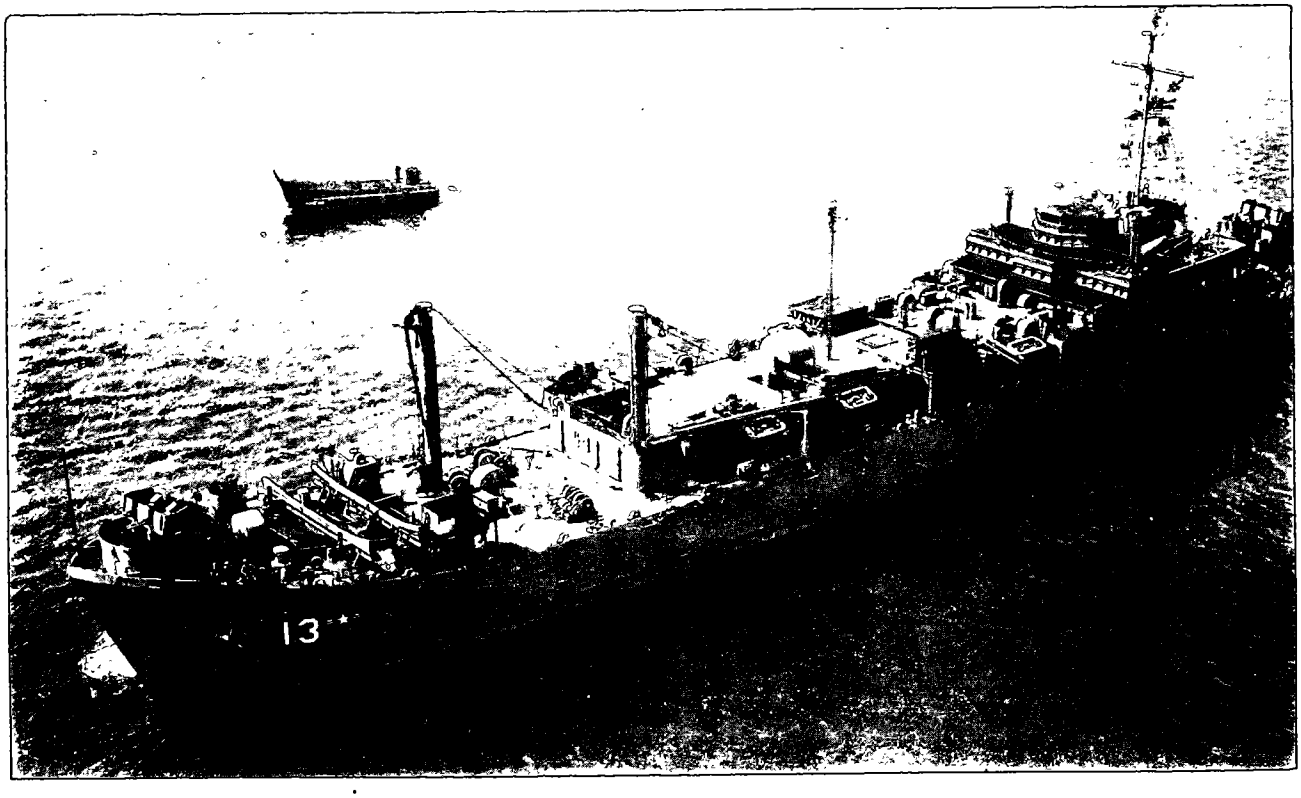


Figure B–3. Landing craft repair ship (ARL).

for landing ships and craft. Naval elements aboard perform up to direct support maintenance. Army maintenance personnel also may perform direct support maintenance aboard this ship. Minimum logistic support is maintained on board.

(2) *Specific data.*

Length:	328 feet
Width:	50 feet
Draft:	14 feet
Weight:	3,640 tons (full load)
Speed:	12 knots maximum sustained
Engines:	2 diesels
Complement:	15 officers and 232 enlisted
Capacity:	
Cargo:	300 tons
Personnel:	18 officers and 248 enlisted including crew
Fuel:	185,260 gallons
Armament:	2 40-mm quad mounts
Armor protection:	None
Miscellaneous:	
	Bow doors sealed.
	Largest boom—60-ton.
	Cargo space—40,000 cubic feet.

d. Tank Landing Ship.

(1) *General characteristics.* The tank landing ship (LST) normally transports and lands amphibious vehicles, tanks, combat vehicles, and equipment. It frequently serves as a cargo ship in areas where pier space is inadequate and loading/unloading across a beach is necessary. Two classes of LST's, the 542 class and the 1156 class, are currently employed in riverine operations. The 542 class, the smaller of the two, is used as a resupply ship. The 1156 class, when appropriately modified, serves as an organic element of the afloat base in the capacities of a resupply ship, riverine assault craft mother ship, barracks ship, helicopter

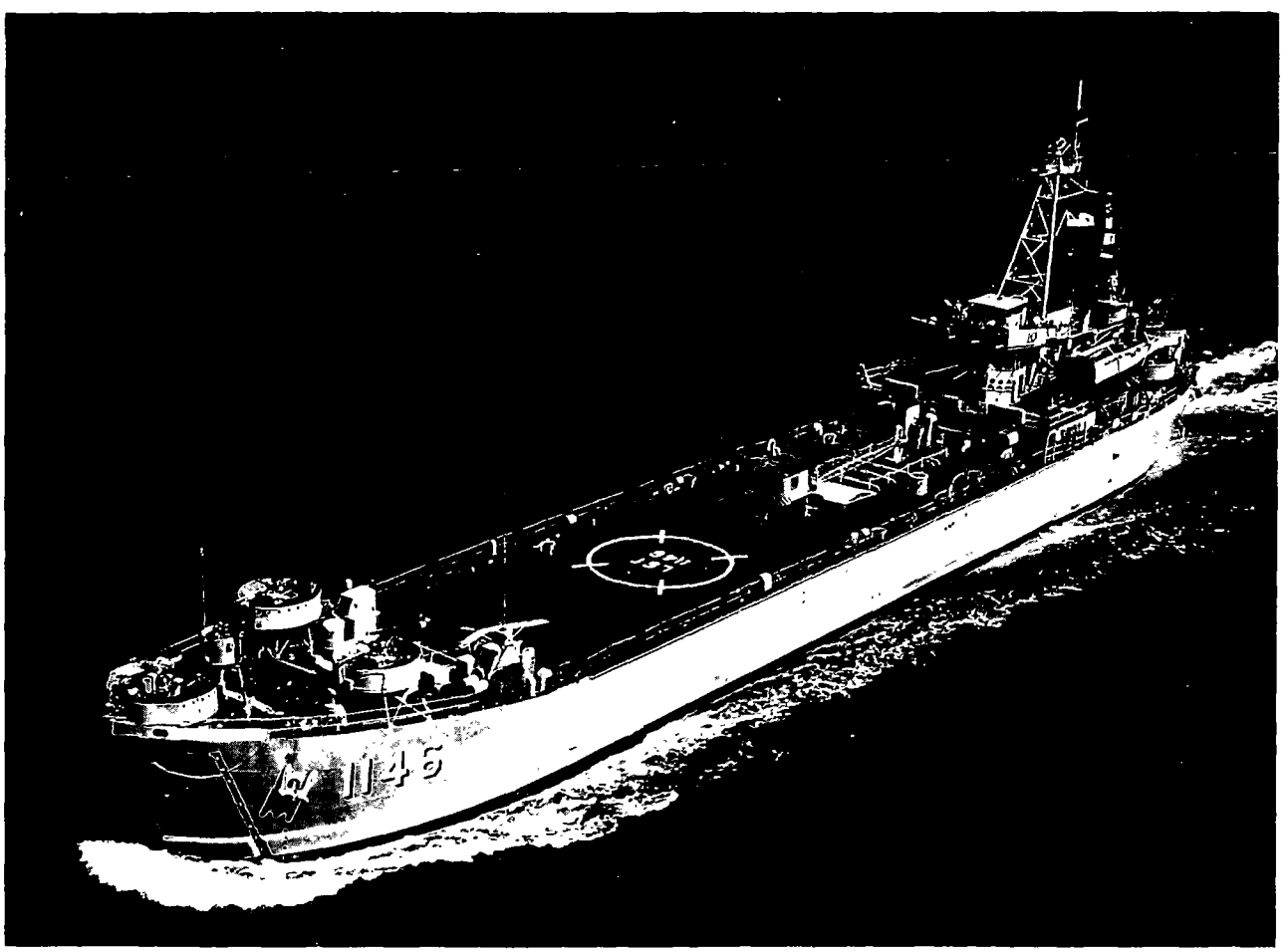


Figure B–4. Tank landing ship (LST)—542 class.

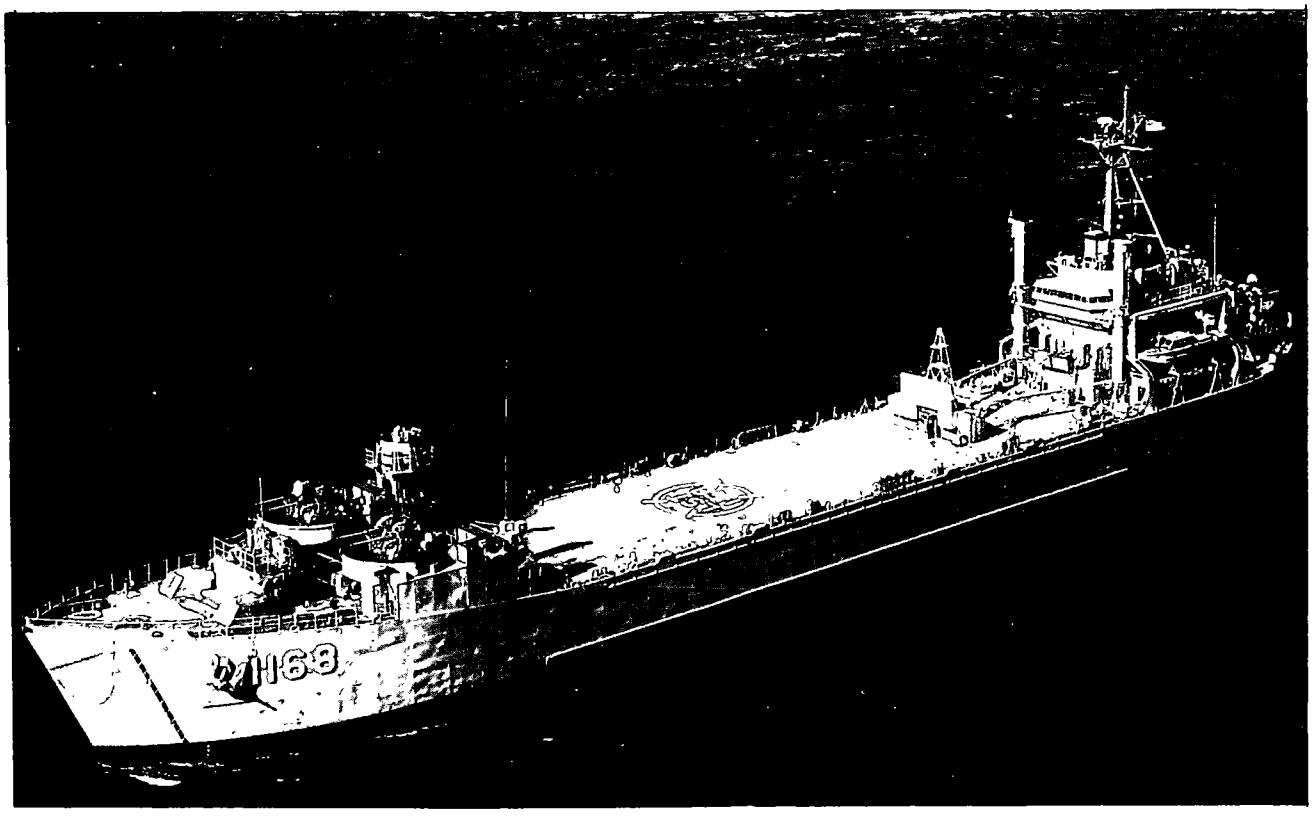


Figure B–5. Tank landing ship (LST)—1156 class.

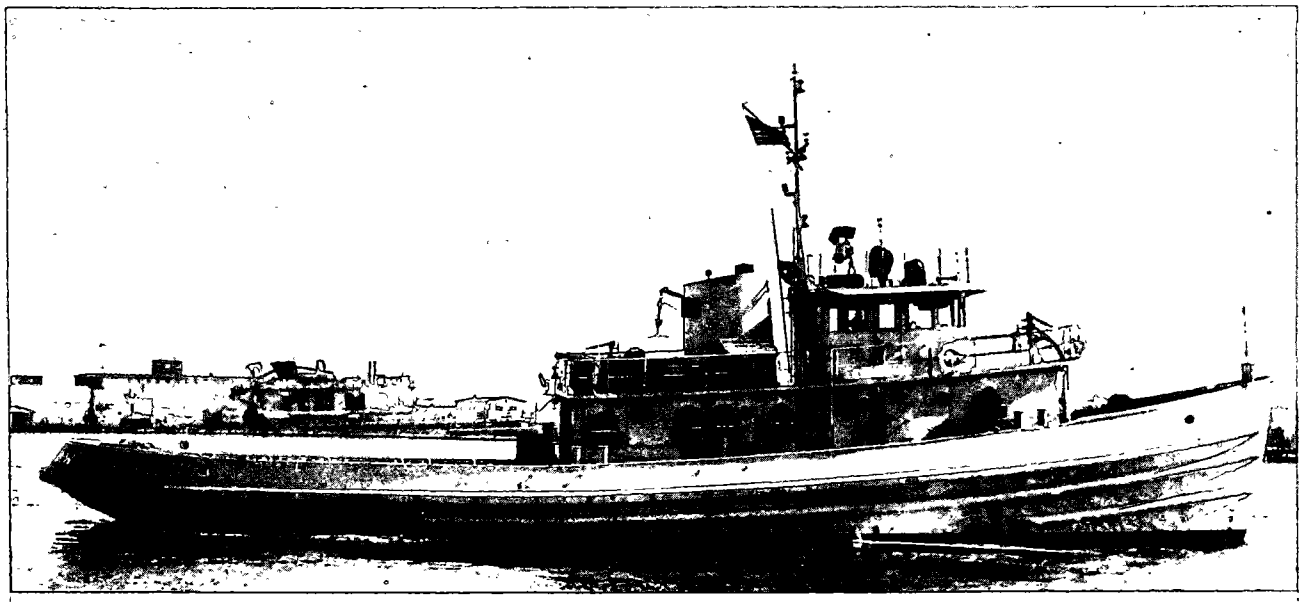


Figure B–6. Large harbor tug (YTB).

base ship, and morgue. Its larger size makes it preferable for use in riverine operations as a part of the afloat base. Both ships have helicopter landing pads.

(2) *Specific data—542 class.*

Length:	328 feet
Width:	50 feet
Weight:	3,640 tons (full load)

Speed:	11 knots maximum
Engines:	2 diesels
Complement:	9 officers and 106 enlisted
Capacity:	
Cargo:	1,500 tons (full load)
Personnel:	10 officers and 110 enlisted plus crew
Fuel:	185,260 gallons
LVT:	14
Armament:	
2 40-mm twin mounts	
2 40-mm single mounts	
Armor protection:	None
Miscellaneous:	
Bow door dimensions	13 by 14 feet
Cargo space:	Tank deck 6,328 square feet
	Weather deck 5,000 square feet
Largest crane:	5 tons
Boat davits:	2 LCVP

(3) *Specific data—1156 class.*

Length:	384 feet
Width:	55.5 feet
Weight:	5,777 tons full load
Speed:	13.5 knots maximum
Engines:	2 diesels
Complement:	10 officers and 165 enlisted
Capacity:	
Cargo:	1,580 tons (full load)
Personnel:	15 officers and 377 enlisted
Fuel:	Sufficient for sustained endurance of 17,300 nautical miles at 9 knots
LVT:	1 LCP(L), 3 LCVP, and 17 LVT
Armament:	3 3-inch twin mounts
Armor protection:	None
Miscellaneous:	
Bow door dimension	15 by 17 feet
Cargo space:	Tank deck 8,400 square feet
	Weather deck: 5,200 square feet
Largest crane:	7 tons
Boat davits:	2 LCVP

e. Large Harbor Tug.

(1) *General characteristics.* The large narbor tug (YTB) has the capability to provide assistance to other ships and craft, including pushing, towing, firefighting, and minor salvage work.

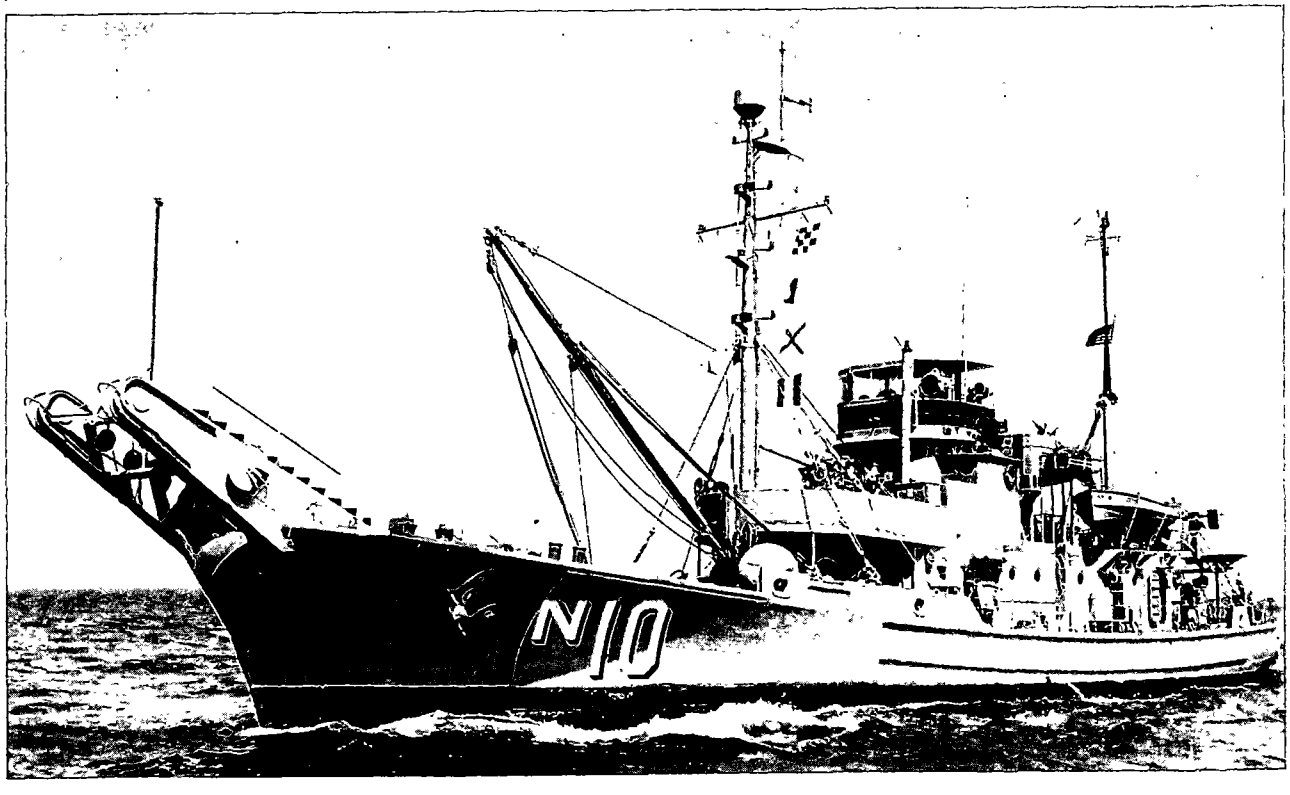


Figure B-7. Net laying ship (AN).

(2) *Specific data.*

Length:	109 feet
Width:	28 feet
Draft:	13 feet
Speed:	12 knots
Crew:	12
Engine:	1 diesel
Armament:	None
Armor protection:	None

f. Net Laying Ship.

(1) *General characteristics.* Net laying ships (AN) lay, maintain, and recover nets, booms, and other harbor defense equipment.

(2) *Specific data.*

Length:	169 feet
Width:	34 feet
Draft:	15 feet
Weight:	855 tons
Speed:	12.7 knots
Engines:	1 diesel
Complement:	5 officers and 49 enlisted
Armament:	3 20-mm twin mounts
Armor protection:	None
Miscellaneous:	Largest boom—10-tons

g. Armored Troop Carrier.

(1) *General characteristics.* The armored troop carrier (ATC), a converted LCM(6), functions as the general-purpose carrier of the river assault squadron (RAS).

(2) *Specific data.*

Length:	56 feet
Width:	17 feet 6 inches
Height above waterline:	reducible to 9 feet 6 inches
Draft:	3 feet 4 inches (full load)
Weight:	130,900 pounds
Speed:	8 to 12 knots
Engines:	2 diesels (GM6–71)
Capacity:	
Weight:	240,000 pounds
Personnel:	40 (+)
Vehicles:	1 APC 1 105-mm howitzer with prime mover
Armament:	
	1 20-mm cannon 2 .50-caliber machineguns 4 7.62-mm machineguns 2 40-mm grenade launchers
Armor protection:	Yes
Miscellaneous:	
Bow ramp width:	9 feet 6 inches
Cargo deck:	9 feet 6 inches by 31 feet 2 inches
	Chain drag minesweeping equipment

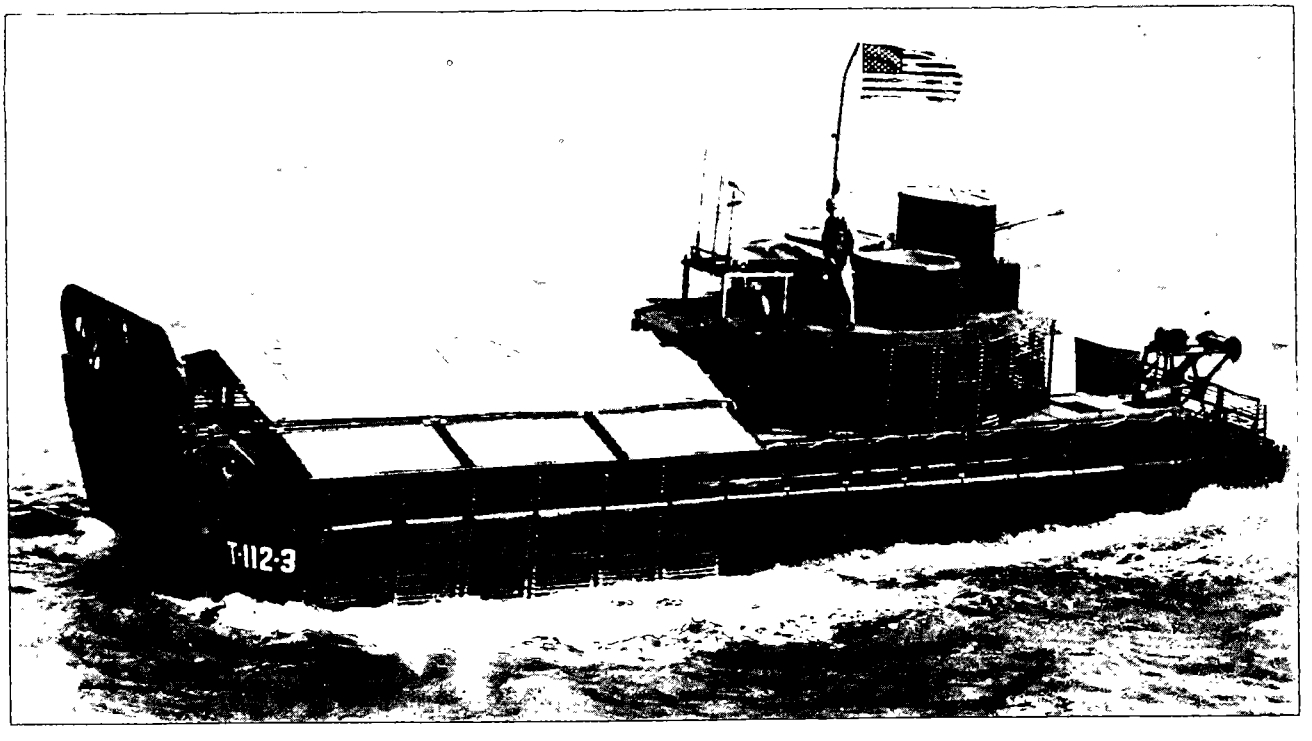


Figure B–8. Armored troop carrier (ATC).

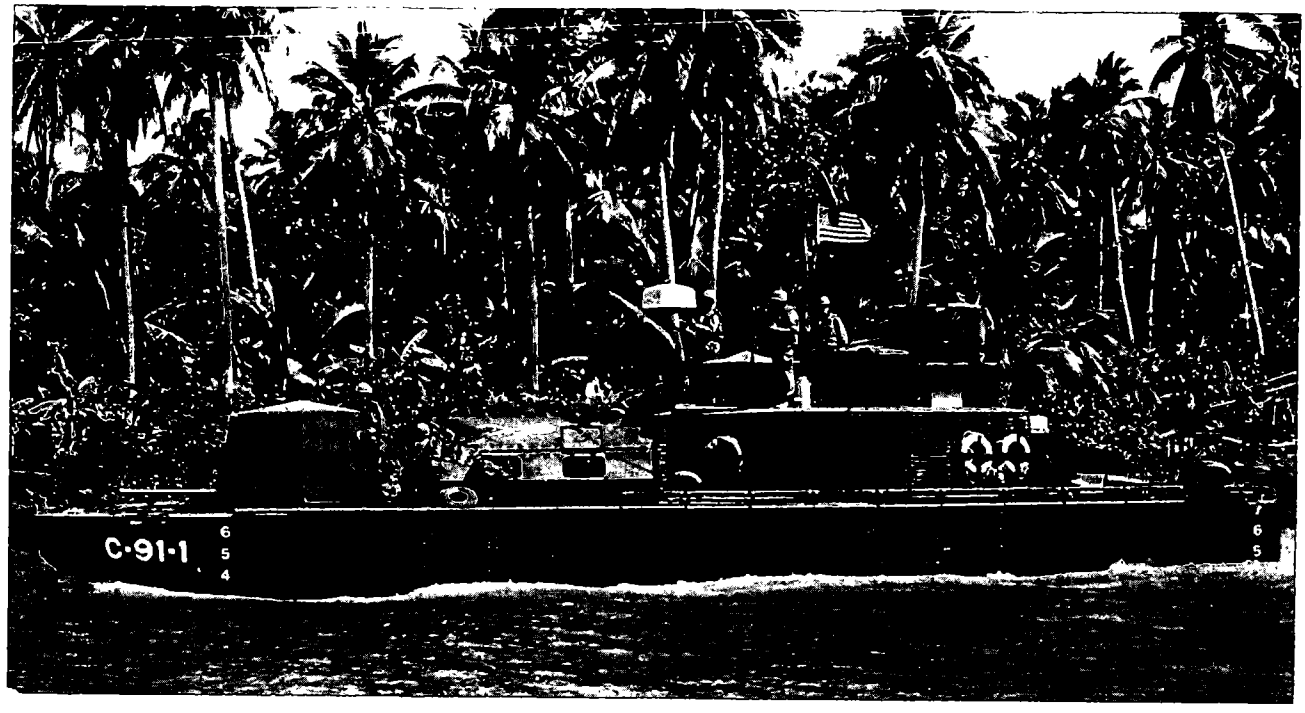


Figure B–9. Command and control boat (CCB).

(3) *Refueler.* The refueler is the ATC with portable tanks installed in the cargo well. The capacity of the tanks is 1,200 gallons of gasoline, 300 gallons of oil, and a 300-gallon mixing tank.

h. Command and Control Boat.

(1) *General characteristics.* The command and control boat (CCB) serves as a floating communications facility and command post for Navy and Army commanders controlling riverine operations. The hull modifications are generally similar to those of the ATC. A faired bow has been added and a command and communications compartment has been installed in the cargo well.

(2) *Specific data.*

Length:	60 feet 6 inches
Width:	17 feet 6 inches
Height above waterline:	reducible to 9 feet 6 inches
Draft:	3 feet 6 inches (full load)
Weight:	167,000 pounds
Speed:	8.25 knots
Range:	150 nautical miles at full load and maximum speed
Engines:	2 diesels (GM6–71)
Crew:	11
Capacity:	
Battalion-size command post	
11 (+) in command and communications compartment	
Armament:	
1 40-mm cannon	
1 20-mm cannon	
3 .50-caliber machineguns	
4 7.62-mm machineguns	
Armor protection:	Yes
Miscellaneous:	
Radar:	1 Raytheon 1900N
Compass:	1 MK–27 gyro
Chain drag minesweeping equipment	

i. Monitor.

(1) *General characteristics.* The monitor provides fire support during water movement and assault landing phases of riverine operations. The hull and superstructure of the monitor closely resemble the CCB, but an 81-mm mortar is installed aft of the 40-mm gun.

(2) *Specific data.*

Length:	60 feet 6 inches

Width:	17 feet 6 inches
Height above waterline:	reducible to 9 feet 6 inches
Draft:	3 feet 6 inches
Weight:	169,000 pounds
Speed:	8.25 knots
Range:	150 nautical miles at full load and maximum speed
Engines:	2 diesels (GM6–71)
Crew:	7
Capacity:	No space designated for Army personnel
Armament:	
1 40-mm cannon	
1 81-mm mortar	
1 20-mm cannon	
3 .50-caliber machineguns	
4 7.62-mm machineguns	
Armor protection:	Yes
Miscellaneous:	
Radar:	1 Raytheon 1900N
Compass:	1 MK–27 gyro
Chain drag minesweeping equipment	

j. Assault Support Patrol Boat.

(1) *General characteristics.* The assault support patrol boat (ASPB) is a fast, highly maneuverable craft for fire support, minesweeping, patrolling, and convoy escort on inland waterways.

(2) *Specific data.*

Length:	50 feet
Width:	15 feet 2 inches
Height above waterline:	reducible to 9 feet 9 inches
Draft:	3 feet 9 inches
Weight:	71,000 pounds (full load)
Speed:	15 knots maximum, 10 knots cruise
Range:	200 nautical miles at 10 knots and full load
Engines:	2 diesels (GM12V–71)
Crew:	7
Capacity:	5,000 pounds; about 15 troops
Armament:	
1 20-mm cannon	
1 twin .50-caliber or 7.62-mm machinegun with automatic 40-mm launcher	
1 81-mm mortar	
Armor protection:	Yes
Miscellaneous:	Chain drag minesweeping equipment

k. Inshore Fire Support Ship.

(1) *General characteristics.* The inshore fire support ship (IFS), designed to provide a high volume of rocket fire for neutralization of shore defenses in preparation for amphibious assault, also provides fire support for troops ashore.

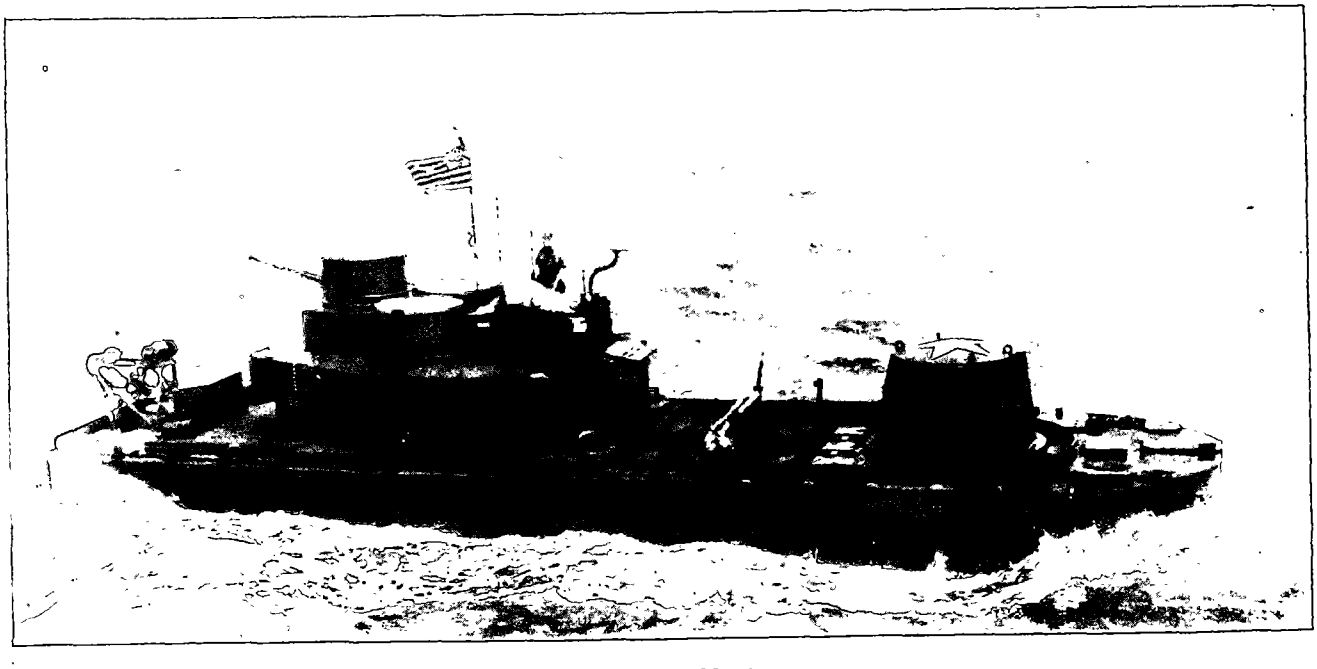


Figure B–10. Monitor.

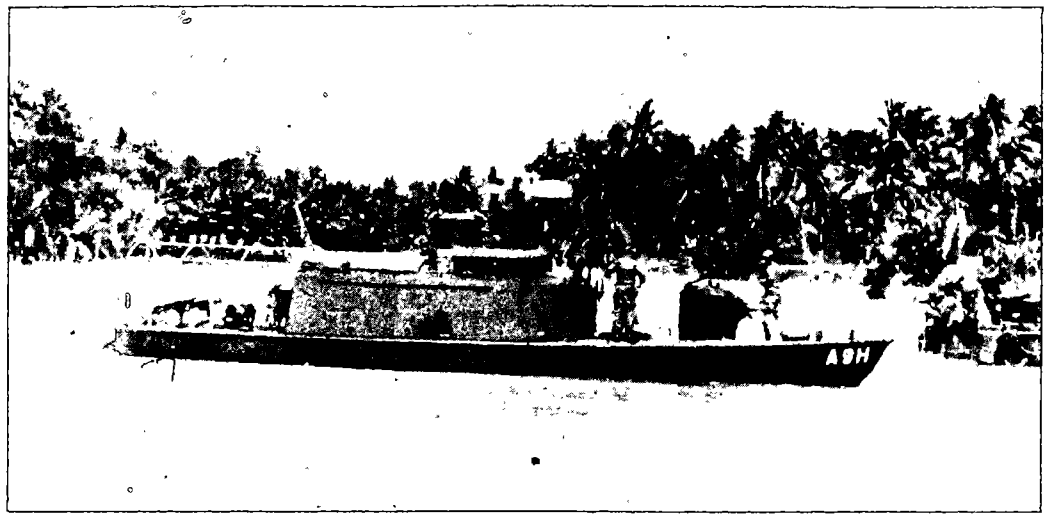


Figure B–11. Assault support patrol boat (ASPB).

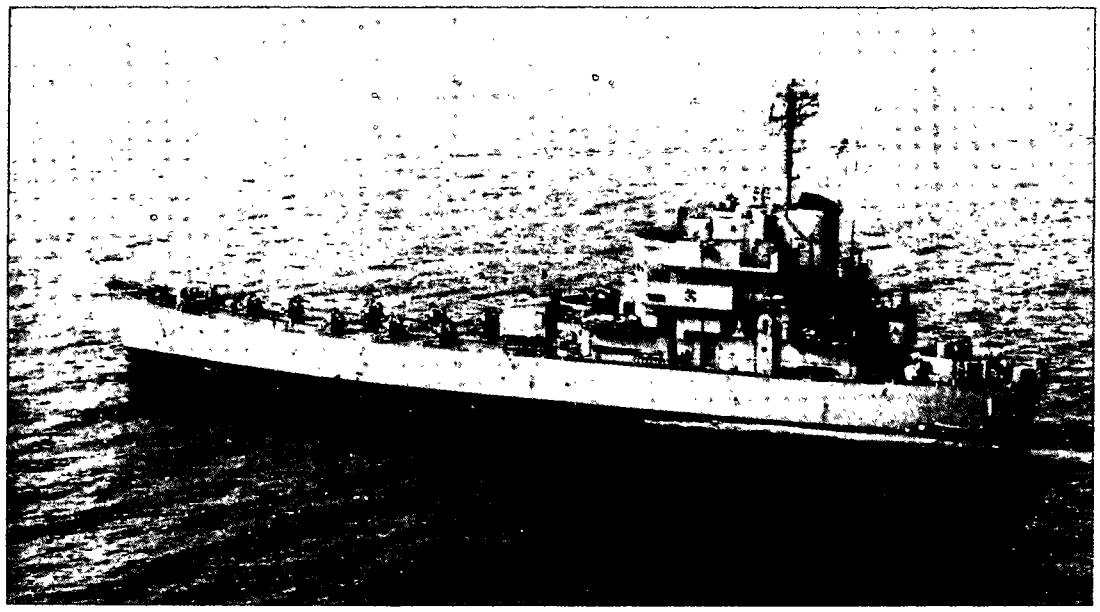


Figure B–12. Inshore fire support ship (IFS).

(2) *Specific data.*

Length:	245 feet
Width:	38 feet
Draft:	10 feet
Weight:	1,560 tons
Speed:	15 knots maximum sustained
Engines:	2 diesels
Complement:	9 officers and 140 enlisted
Armament:	
1 5-inch/.38-caliber single mount	
8 5-inch rocket launchers	
Armor protection:	None

l. Landing Ship, Medium, Rocket.

(1) *General characteristics.* The landing ship, medium, rocket (LSMR) is designed to

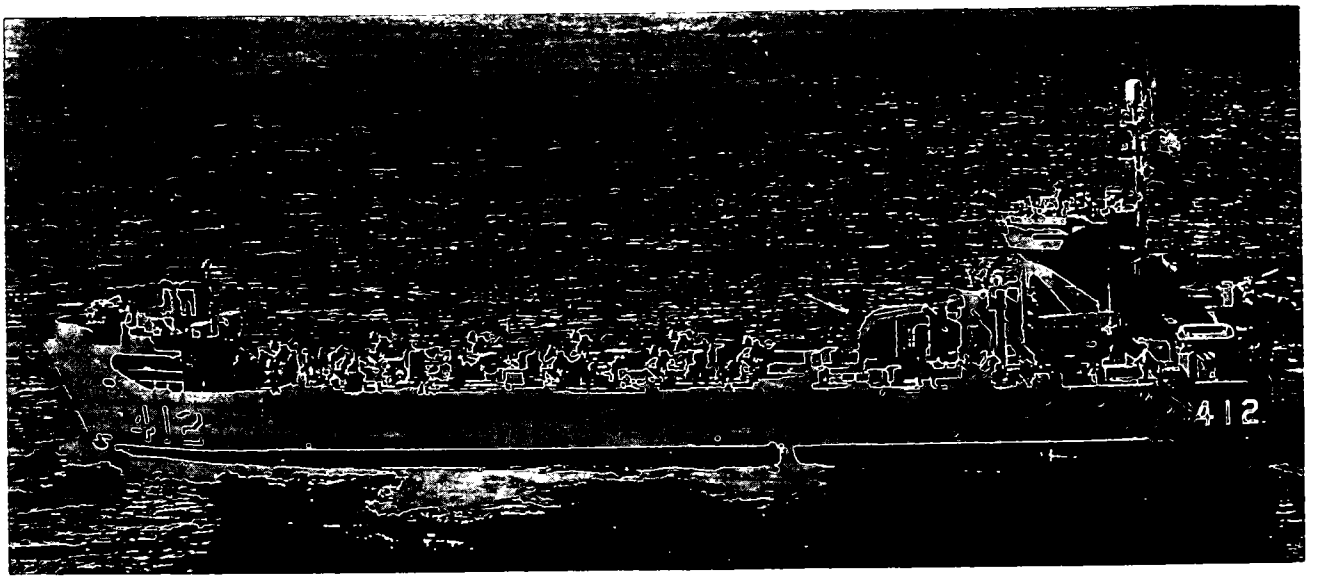


Figure B–13. Landing ship, medium, rocket (LSMR).

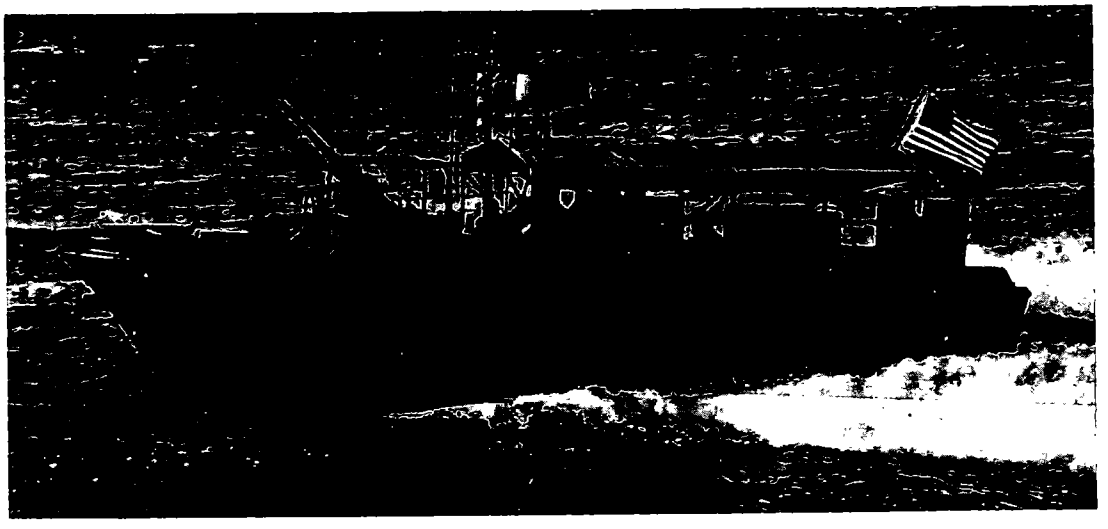


Figure B–14. Patrol boat, river (PBR).

provide a high volume of rocket fire for neutralization of shore defenses in preparation for amphibious landings. It can also provide fire support for troops ashore and destroy surface and air targets at close range.

(2) *Specific data.*

Length:	211 feet
Width:	34 feet 6 inches
Draft:	9 feet 10 inches
Weight:	1,280 tons
Speed:	13 knots maximum
Engines:	2 diesels
Complement:	7 officers and 119 enlisted
Armament:	
1 5-inch/.38-caliber single mount	
2 40-mm twin mounts	
8 5-inch rocket launchers	
Armor protection:	None

m. Patrol Boat, River.

(1) *General characteristics.* The patrol boat, river (PBR) is a fast, fiber glass-hull, shallow-draft patrol boat for interdiction patrols on major waterways. It has water-jet propulsion.

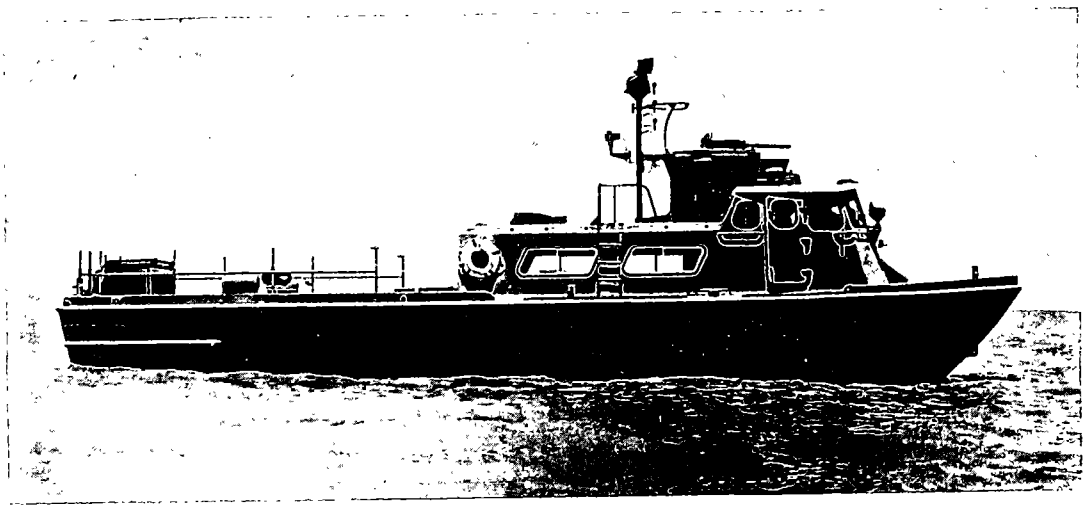


Figure B–15. Patrol craft, fast (swift) (PCF).

Figure B–16. Inflatable boat, small (IBS).

(2) *Specific data.*

Length:	31 feet
Width:	10 feet 8 inches
Draft:	18 inches (at rest); 9 inches (at speed)
Weight:	14,500 pounds
Speed:	25 knots maximum
Engines:	2 diesels (GM6V–53)
Crew:	4 or 5
Capacity:	
Weight:	2,000 pounds
Personnel:	6 including boat crew
Armament:	
1 twin .50-caliber machinegun	
1 single .50-caliber machinegun	
1 40-mm grenade launcher	
Armor protection:	Yes

n. Patrol Craft, Fast (Swift).

(1) *General characteristics.* The patrol craft, fast (swift) (PCF) is a high-speed, shallow-draft boat configured for patrols on coastal and major inland waterways.

(2) *Specific data.*

Length:	50 feet 1 inch
Width:	13 feet 6 inches
Draft:	5 feet
Weight:	43,000 pounds
Speed:	28 knots maximum
Engines:	2 diesels (GM12V–71)
Crew:	1 officer and 5 enlisted
Capacity:	10,000 pounds weight
Armament:	
1 twin .50-caliber mount	
1 naval 81-mm mortar with .50-caliber machinegun	
Armor protection:	None

o. Inflatable Boat, Small.

(1) *General characteristics.* The inflatable boat, small (IBS) is an inflatable, pneumatic boat with good steering and maneuvering characteristics. This craft is suitable for silent water operations and may be propelled by paddles, poles, or small outboard motors.

(2) *Specific data.*

Length:	12 feet

Width:	6 feet
Draft:	16 inches
Weight:	225 pounds
Speed:	Paddle speed or about 5 knots per hour with motor
Propulsion:	Paddle, pole, or up to 7½-horsepower outboard motor
Capacity:	
Weight:	1,000 pounds (estimated)
Personnel:	7
Armament:	Individual weapons
Armor protection:	None

p. Minesweeping Boat.

(1) *General characteristics.* The minesweeping boat (MSB) is a wooden-hull craft designed to sweep mines in shallow water less than 9 meters in depth.

(2) *Specific data.*

Length:	57 feet
Width:	15 feet
Draft:	5 feet 6 inches
Weight:	45 tons
Speed:	11 knots; 6.5 knots (sweeping)
Engines:	2 diesels
Crew:	7
Armament:	.30- and .50-caliber machineguns installed for employment in Vietnam
Armor protection:	None

q. Air Cushion Vehicle.

(1) *General characteristics.* The air cushion vehicle (ACV), a militarized version of the Bell Aerosystems SK–5 air cushion vehicle, can travel over water and marginal terrain at speeds up to 55 knots. The ACV can clear a vertical wall 1 meter high, an earth mound 1.5 meters high, cross ditches up to 3.5 meters wide and 2.5 meters deep, and travel over vegetation 1.8 meters high. The Army is procuring three air cushion vehicles, which are similar to the Navy's PACV's.

(2) *Specific data.*

Length:	38 feet 9 inches
Width:	23 feet
Height:	16 feet 6 inches
Weight:	
Net:	16,325 pounds
Combat loaded:	18,350 pounds
Capacity:	
Crew:	7

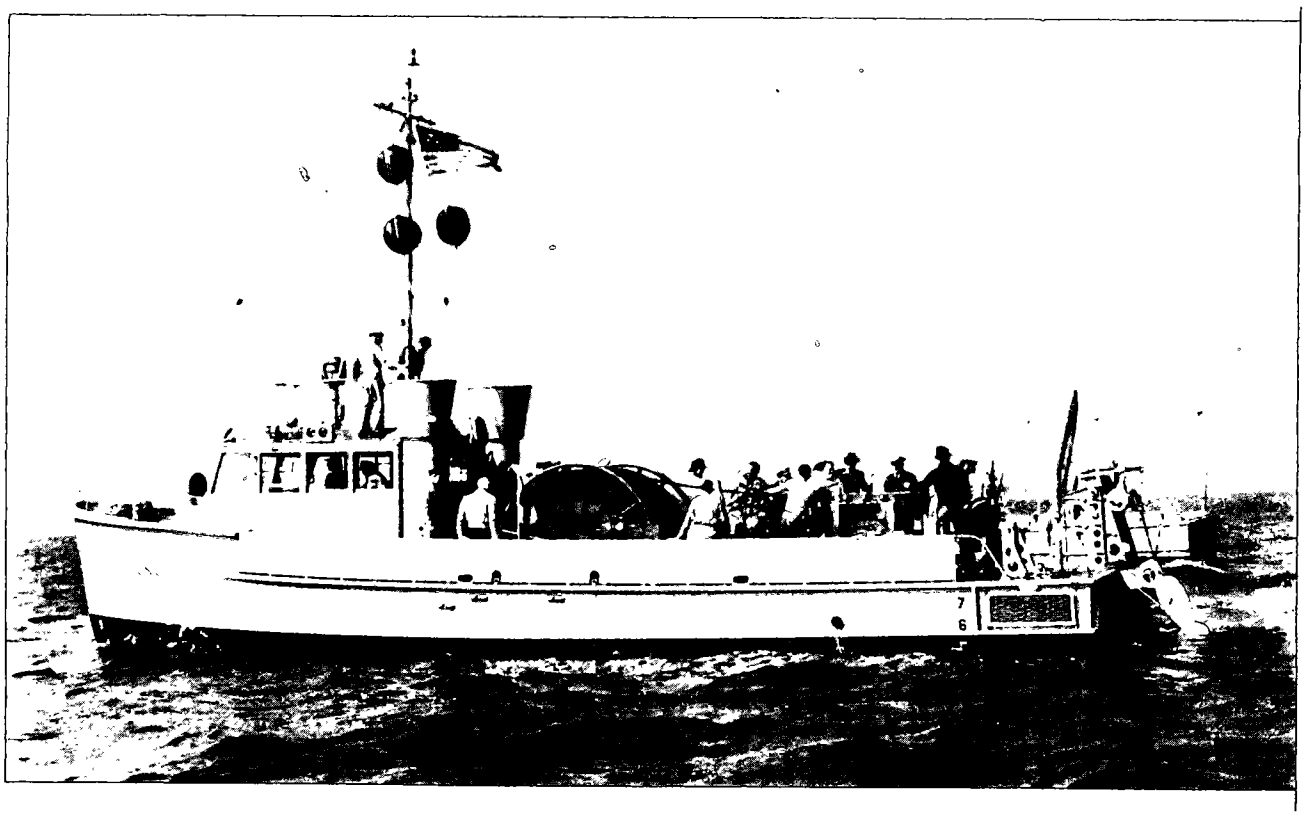


Figure B–17. Minesweeping boat (MSB).

Troops:	4 plus crew
Cargo weight:	880 pounds
Cargo space:	144 by 92 by 72 inches
Speed:	
Maximum:	55 knots
Cruising:	50 knots
Range:	300 nautical miles
Gradability:	
Forward slope:	12 percent at zero speed 30 percent for 50 yards with 25 knots initial speed
Side slope:	12 percent
Turning radius:	
Pivot:	30 feet
Cruise:	200 yards at 30 knots 550 yards at 50 knots
Draft:	
Cushionborne:	None
Afloat:	8 inches
Armament:	2 .50-caliber machineguns on cabin roof 2 7.62-mm M60 machineguns installed in port starboard side window and center bow window 1 40-mm grenade launcher
Armor protection:	Limited

r. Patrol Boat (Coast Guard).

(1) *General characteristics.* The patrol boat (Coast Guard) (WPB) is designed for law enforcement and search and rescue. It has been fitted with additional deck-mounted weapons for coastal patrol in Vietnam.

(2) *Specific data.*

Length:	82 feet
Width:	17 feet
Draft:	6 feet
Weight:	65 tons
Speed:	17 knots
Engines:	2 diesels
Complement:	10
Armament:	
4 .50-caliber machineguns	
1 naval 81-mm mortar with .50-caliber machinegun	
Armor protection:	None

s. Patrol Craft.

(1) *General characteristics.* The patrol

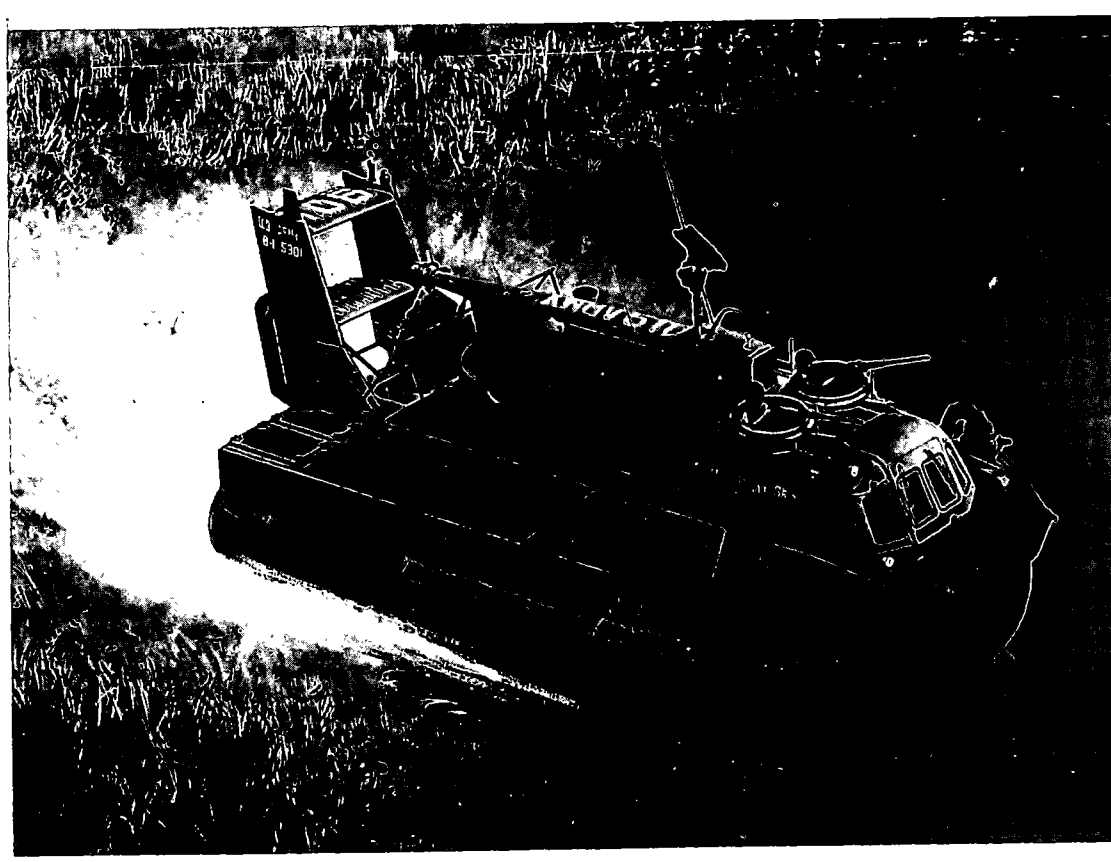


Figure B–18. Personnel air cushion vehicle (PACV).

craft (PC), designed for convoy-escort operations at sea, is employed in coastal patrol and gunfire support.

(2) *Specific data.*

Length:	174 feet
Width:	23 feet
Draft:	8 feet
Weight:	450 tons
Speed:	16.7 knots maximum (15 knots maximum sustained)
Engines:	2 diesels (GM16–258–S)
Crew:	6 officers and 54 enlisted
Armament:	
1 3-inch/.50-caliber single mount	
1 40-mm single mount	
1 20-mm twin mount	
2 20-mm single mounts	
1 60-mm mortar	
Armor protection:	None

t. Patrol Craft, Escort.

(1) *General characteristics.* The Vietnamese Navy patrol craft, escorts (PCE) are ex-U.S. craft (converted PCE and MSF's (minesweeper fleet)) and are employed in coastal patrol and gunfire support.

(2) *Specific data.*

Length:	184 feet 6 inches
Width:	33 feet
Draft:	9 feet
Weight:	944 tons
Speed:	14.7 knots maximum (14 knots maximum sustained.)
Engines:	2 diesels
Crew:	6 officers and 83 enlisted
Armament:	
1 3-inch/.50-caliber single mount	
2 40-mm single mounts	
4 20-mm twin mounts	
Armor protection:	None

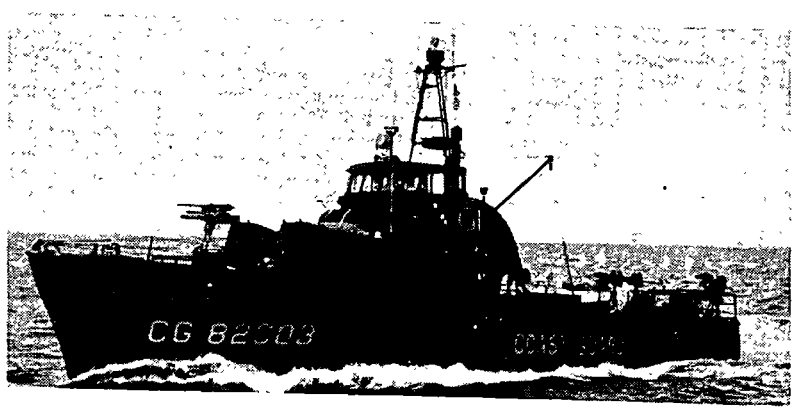


Figure B–19. Patrol boat (Coast Guard) (WPB).

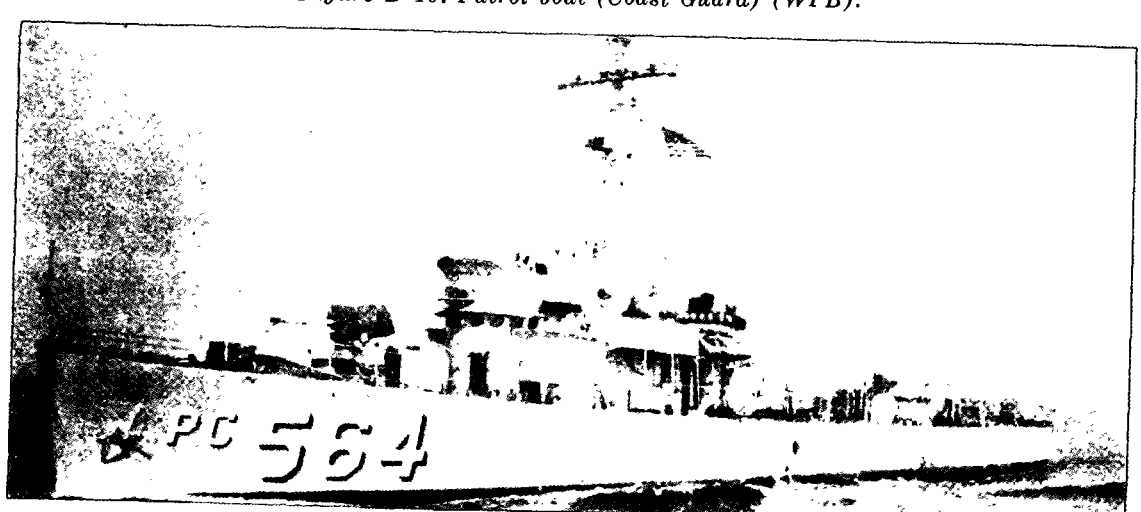


Figure B–20. Patrol craft (PC).

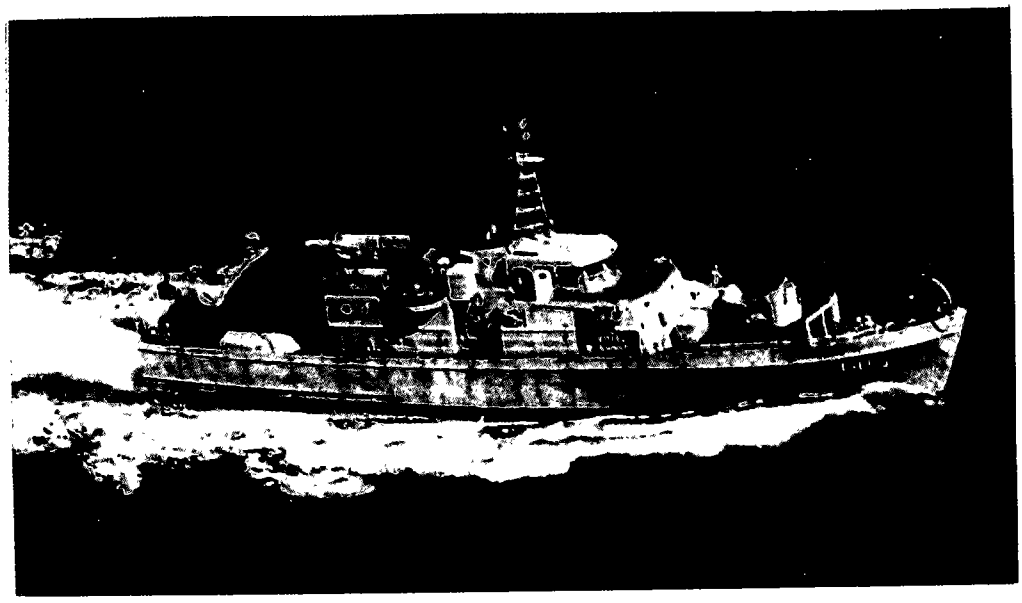


Figure B–21. Patrol craft, escort (PCE).

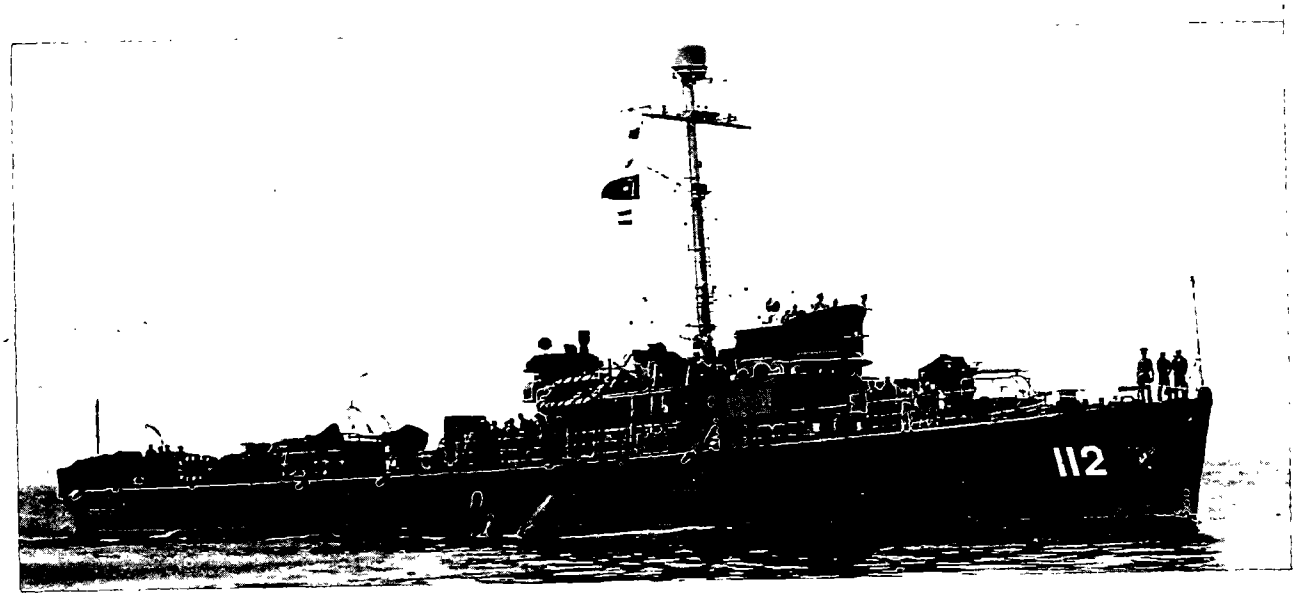


Figure B–22. Patrol motor gunboat (PGM).

u. Patrol Motor Gunboat.

(1) *General characteristics.* The patrol motor gunboat (PGM) is designed to conduct patrol, gunfire support, and escort operations in coastal and inland waterways.

(2) *Specific data.*

Length:	101 feet
Width:	21 feet
Draft:	8 feet
Weight:	143 tons
Speed:	17 knots maximum (16.5 knots maximum sustained)
Engines:	2 diesels
Crew:	8 officers and 25 enlisted

Armament:
1 40-mm single mount
2 20-mm single mounts
2 .50-caliber machinegun single mounts
Armor protection: None

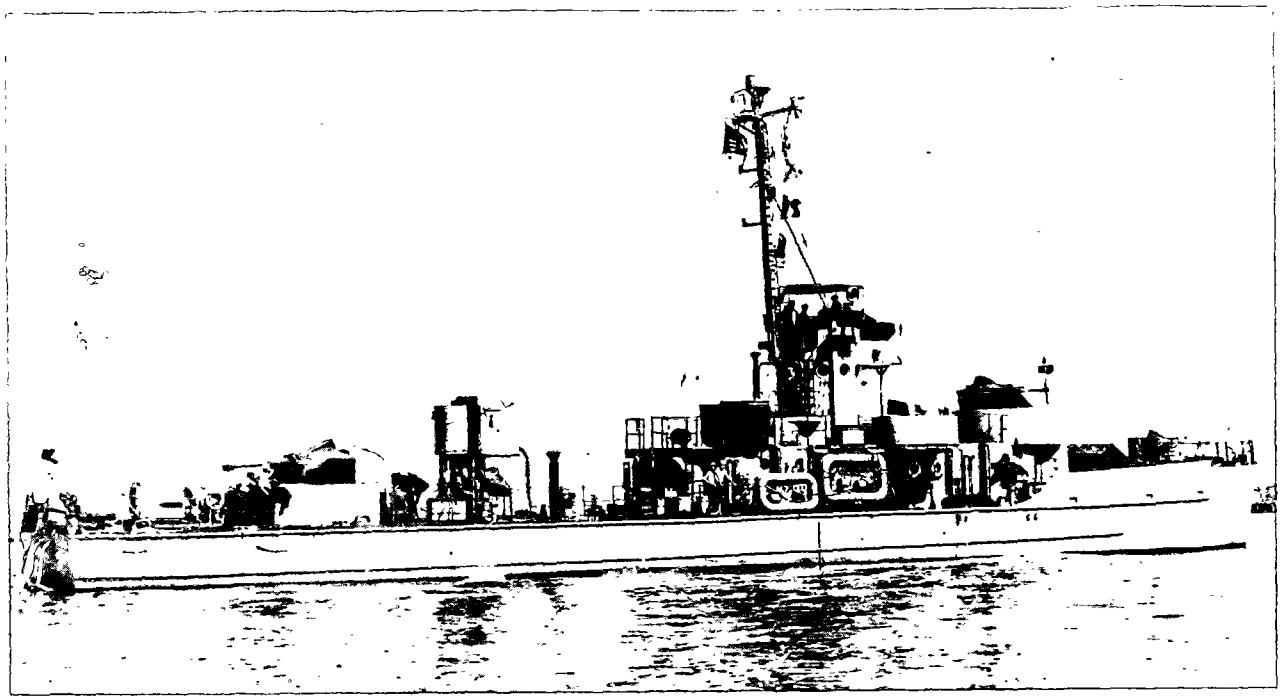


Figure B–23. Landing ship, support, large (LSSL).

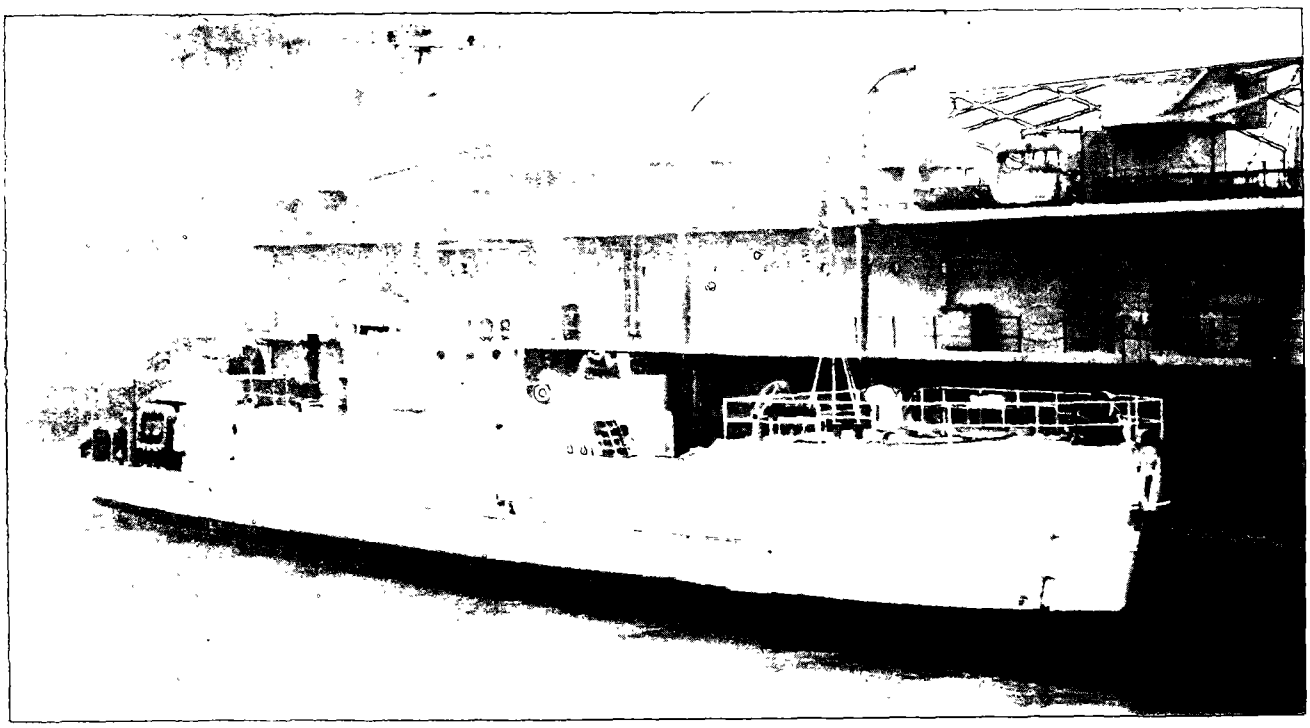


Figure B–24. Landing ship, infantry, large (LSIL).

v. Landing Ship, Support, Large.

(1) *General characteristics.* The landing ship, support, large (LSSL) can transport troops and light equipment. It was designed primarily for fire support of amphibious operations and has no ramp.

(2) *Specific data.*

Length:	137 feet
Width:	23 feet
Draft:	6 feet
Weight:	387 tons
Speed:	15 knots maximum (9 knots maximum sustained)
Crew:	6 officers and 54 enlisted
Engines:	8 diesels (GM6–71)
Capacity:	60 personnel (combat equipped)
Armament:	
1 3-inch/.50-caliber single mount	
3 40-mm twin mounts	
4 20-mm single mounts	
2 81-mm mortars	
2 60-mm mortars	
Armor protection:	None

w. Landing Ship, Infantry, Large.

(1) *General characteristics.* The landing ship, infantry, large (LSIL) can transport and land troops and light equipment. It has good fire support capabilities.

(2) *Specific data.*

Length:	158 feet
Width:	24 feet
Draft:	7 feet
Weight:	393 tons
Speed:	12.5 knots maximum (10 knots maximum sustained)
Engines:	8 diesels (GM6–71)
Crew:	5 officers and 50 enlisted
Capacity:	
Weight:	12 tons
Personnel:	76 (combat equipped)
Armament:	
1 3-inch/.50-caliber single muont	
1 40-mm single mount	
2 20-mm single mounts	
2 .50-caliber machinegun single mounts	
2 81-mm mortars	
2 60-mm mortars	
Armor protection:	None

x. Landing Ship, Medium.

(1) *General characteristics.* The landing ship, medium (LSM) is designed to transport

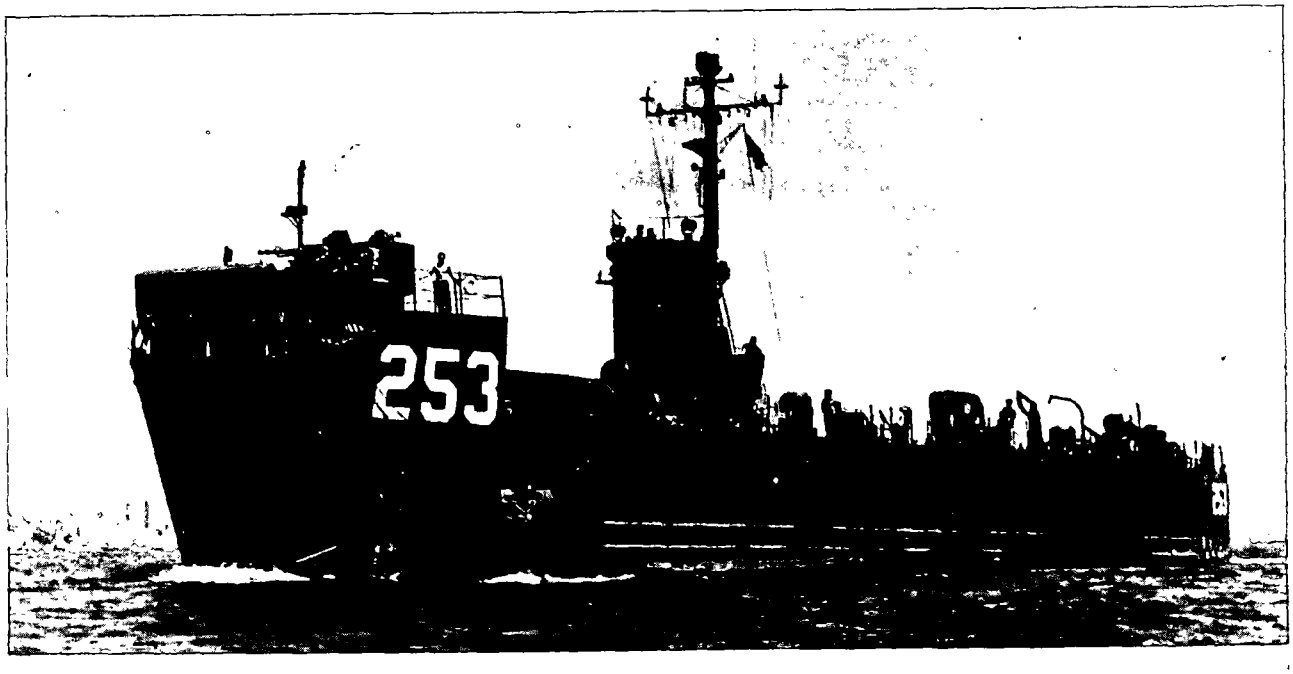


Figure B–25. Landing ship, medium (LSM).

and land troops, vehicles, and tanks. It has an open well deck and discharges cargo and troops through bow doors.

(2) *Specific data.*

Length:	204 feet
Width:	35 feet
Draft:	10 feet
Weight:	1,095 tons
Speed:	13 knots maximum (12.5 knots maximum sustained)
Engines:	2 diesels (F–M38D81/8
Crew:	5 officers and 73 enlisted
Capacity:	
Weight:	250 tons
Personnel:	400 (combat equipped)
Armament:	
1 40-mm twin mount	
2 20-mm single mounts	
2 4.5-inch rocket launches (twin)	
Armor protection:	None
Miscellaneous:	
Bow door:	14 feet by 14 feet
Cargo space:	12 feet by 23 feet by 186 feet

y. Minesweeper, Coastal.

(1) *General characteristics.* The minesweeper, coastal (MSC), designed to sweep mines in water as shallow as 9 meters, conducts limited mine hunting and is capable of limited self-defense. This ship is often employed in coastal patrol.

(2) *Specific data.*

Length:	144 feet
Width:	28 feet
Draft:	10 feet 6 inches
Weight:	360 tons
Speed:	13.5 knots maximum sustained
Engines:	2 diesel (GM8–268A)
Complement:	4 officers and 35 enlisted
Armament:	1 20-mm twin mount
Armor protection:	None

z. Landing Craft, Utility.

(1) *General characteristics.* The landing craft, utility (LCU), designed for amphibious operation to transport tanks and other large vehicles, is often used for inland waterway logistic lifts.

(2) *Specific data.*

Length:	115 feet
Width:	34 feet
Draft:	5.2 feet aft; 3 feet forward
Weight:	196 tons (light load)
Speed:	6 knots (maximum sustained)
Engines:	3 diesels (GM6–71)
Complement:	1 officer and 17 enlisted (Navy)
	2 officers/warrant officers and 9 enlisted (Army)
Capacity:	
Cargo Weight:	170 tons
Personnel:	300 to 400
M113's:	6

Figure B–26. Minesweeper, coastal (MSC).

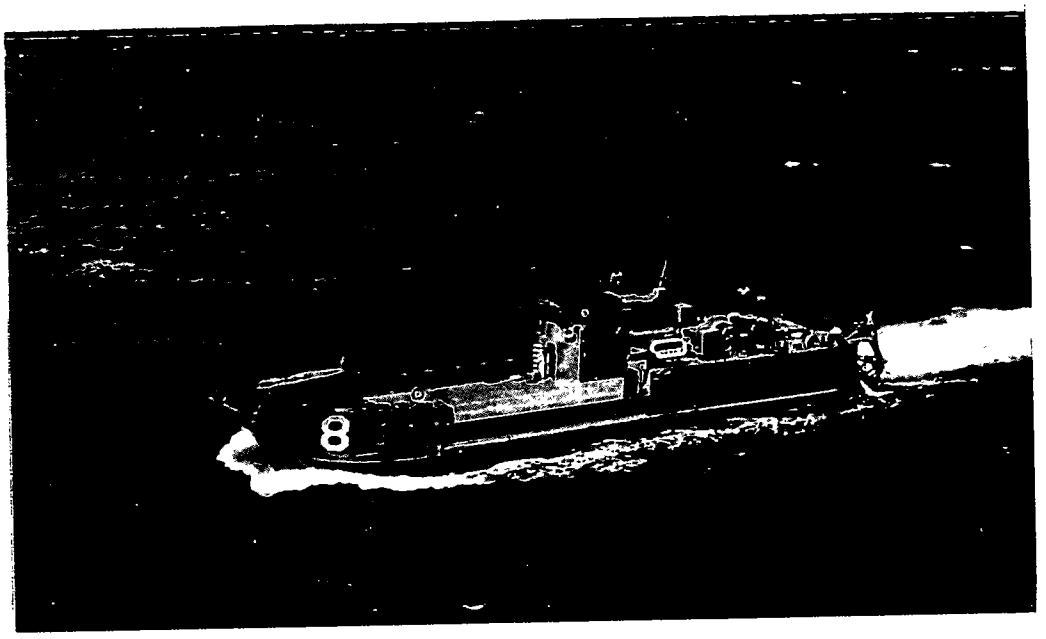


Figure B–27. Landing craft, utility (LCU).

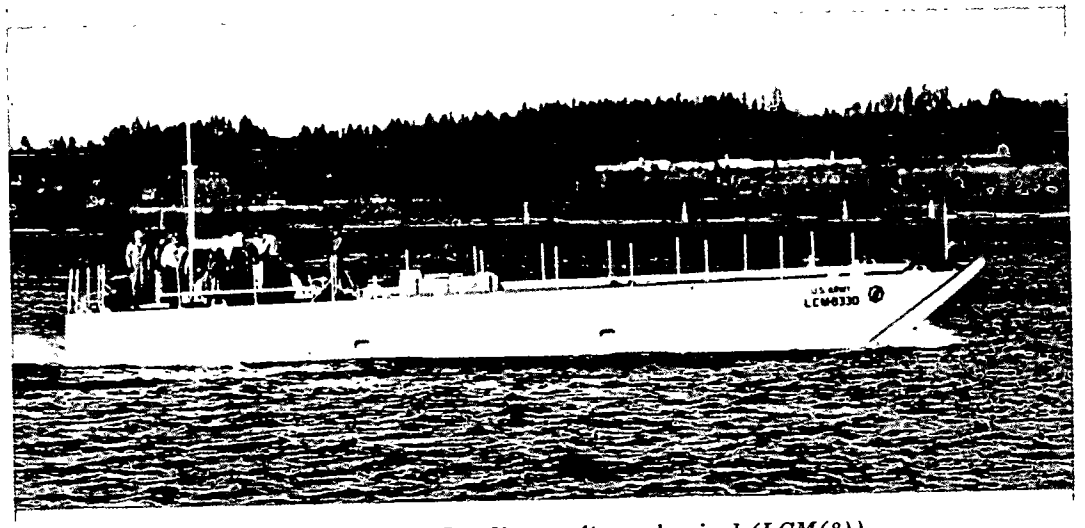


Figure B–28. Landing craft, mechanized (LCM(8)).

2½-ton truck:	8
Armament:	
2 20-mm cannon	
1 60-mm mortar	
Armor protection:	Yes
Miscellaneous:	
Cargo space:	77 feet 6 inches by 30 feet
Bow ramp width:	14 feet 6 inches

aa. Landing Craft, Mechanized.

(1) *General characteristics.* The landing craft, mechanized (LCM(8)), designed for amphibious operations, has been used effectively to carry M113's in the Mekong Delta.

(2) *Specific data.*

Length:	73 feet 7 inches
Width:	21 feet
Draft:	3 feet 10 inches forward (loaded)
	5 feet 2 inches aft (loaded)
	2 feet forward (light)
	3 feet 6 inches aft (light)
Weight:	129,500 pounds (light)
Speed:	9 knots (loaded), 12 knots (light)
Engines:	2 diesels (GM6–71)
Crew:	5 enlisted

Capacity:	
Cargo:	120,000 pounds
Personnel:	200 troops
M113's:	3
Armament:	3 20-mm single mounts
Armor protection:	Yes
Miscellaneous:	
Bow ramp width:	14 feet 6 inches
Cargo space:	45 feet 6 inches by 14 feet 6 inches

ab. Landing Craft, Vehicle/Personnel.

(1) *General characteristics.* The landing craft vehicle/personnel (LCVP), a V-bottom wooden boat with plywood sides and double-planked bottom, lands personnel and small vehicles in amphibious operations. Paramilitary and police forces use it in South Vietnam.

(2) *Specific data.*

Length:	35 feet 8 inches
Width:	10 feet 6 inches
Draft:	3 feet
Weight:	16,400 pounds
Speed:	7 knots
Engines:	1 diesel (GM6–71)
Crew:	3
Capacity:	
Cargo:	8,100 pounds
Personnel:	36 plus crew
Armament:	Various
Armor protection:	Yes
Miscellaneous:	
Bow ramp width:	6 feet 10 inches
Cargo compartment:	17 feet 3 inches by 7 feet 5 inches

ac. Landing Craft, Vehicle/Personnel (Armored).

(1) *General characteristics.* The landing craft, vehicle/personnel (armored) (LCVP (A)) is a converted LCVP normally used for escort and minesweeping in riverine operations.

(2) *Specific data.*

Length:	35 feet 8 inches
Width:	10 feet 6 inches
Draft:	4 feet 6 inches
Weight:	15 tons
Speed:	7 knots maximum (6 knots maximum sustained)
Engines:	1 diesel (GM6–71)
Crew:	9 per 2 (LCVP (A)
Capacity:	
Weight:	4.2 tons
Personnel:	12 (combat equipped)
Armament:	
1 20-mm single mount	
3 .30-caliber machineguns	
Armor protection:	Yes
Miscellaneous:	Equipped to sweep with grapnel and chain drag

ad. Landing Craft, Personnel, Ramped.

(1) *General characteristics.* The landing craft, personnel, ramped (LCPR) is a V-bottom wooden craft with plywood sides and double-planked bottom. Paramilitary organizations use it in Vietnam.

(2) *Specific data.*

Length:	36 feet
Width:	11 feet
Draft:	3 feet 6 inches
Weight:	13,500 pounds
Speed:	10 knots
Engines:	1 diesel (GM6–71)
Crew:	3
Capacity:	
Weight:	8,595 pounds

Figure B–29. Landing craft, vehicle/personnel (LCVP).

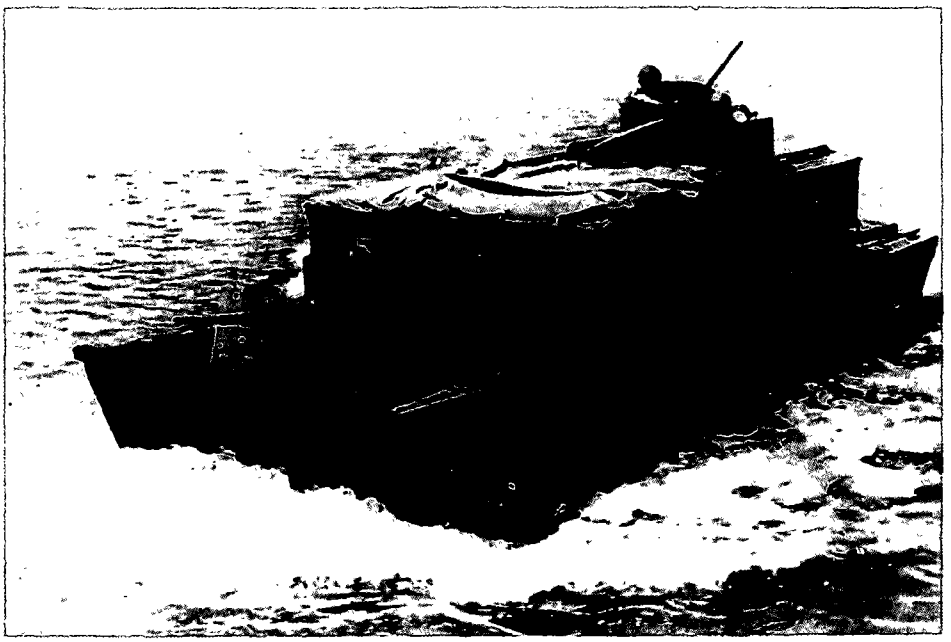


Figure B–30. Landing craft, vehicle/personnel (armored) (LCVP(A)).

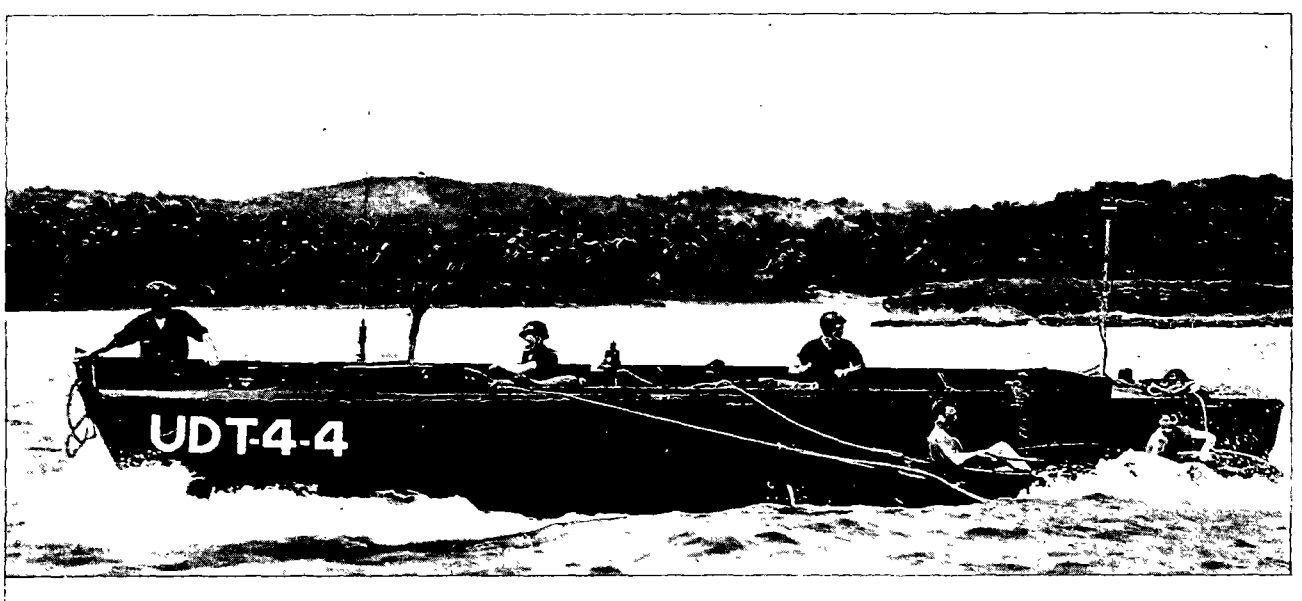


Figure B–31. Landing craft, personnel, ramped (LCP(R)).

Personnel:	39 including crew
Armament:	Various
Armor protection:	Yes
Miscellaneous:	
Bow ramp width:	3 feet 4 inches
Cargo space:	7 feet wide by 21 feet (overall shape is asymmetrical)

ae. Landing Craft, Mechanized (Armored).

(1) *General characteristics.* The landing craft, mechanized (armored) (LCM(A)) is a converted LCM used to transport and land troops, vehicles, and cargo in riverine operations.

(2) *Specific data.*

Length:	56 feet
Width:	14 feet
Draft:	4 feet
Weight:	37 tons

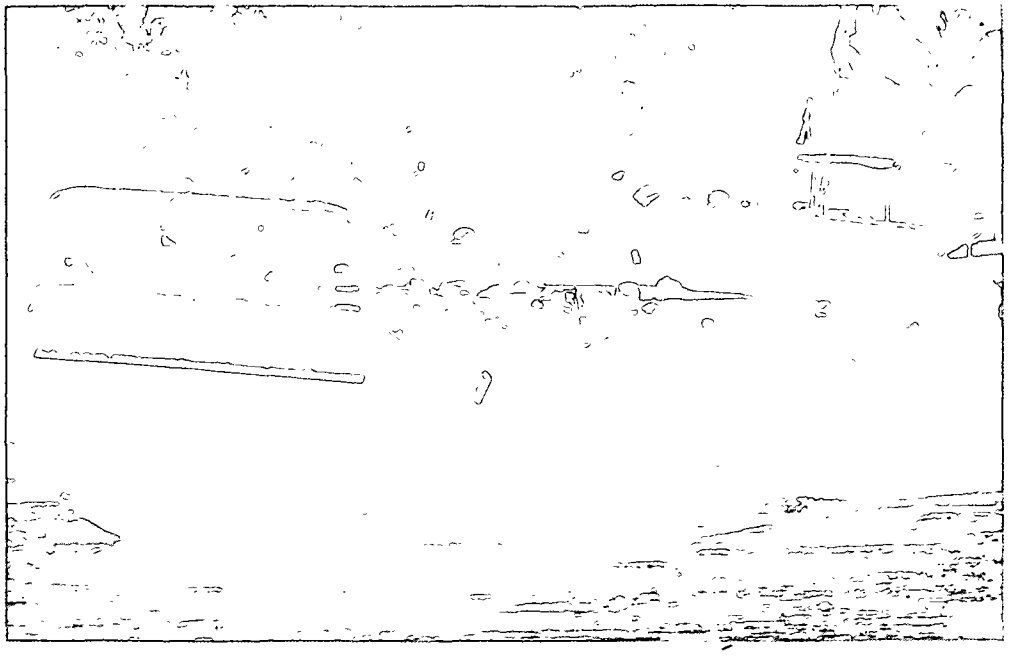


Figure B–32. Landing craft, mechanized (armored) (LCM(A)).

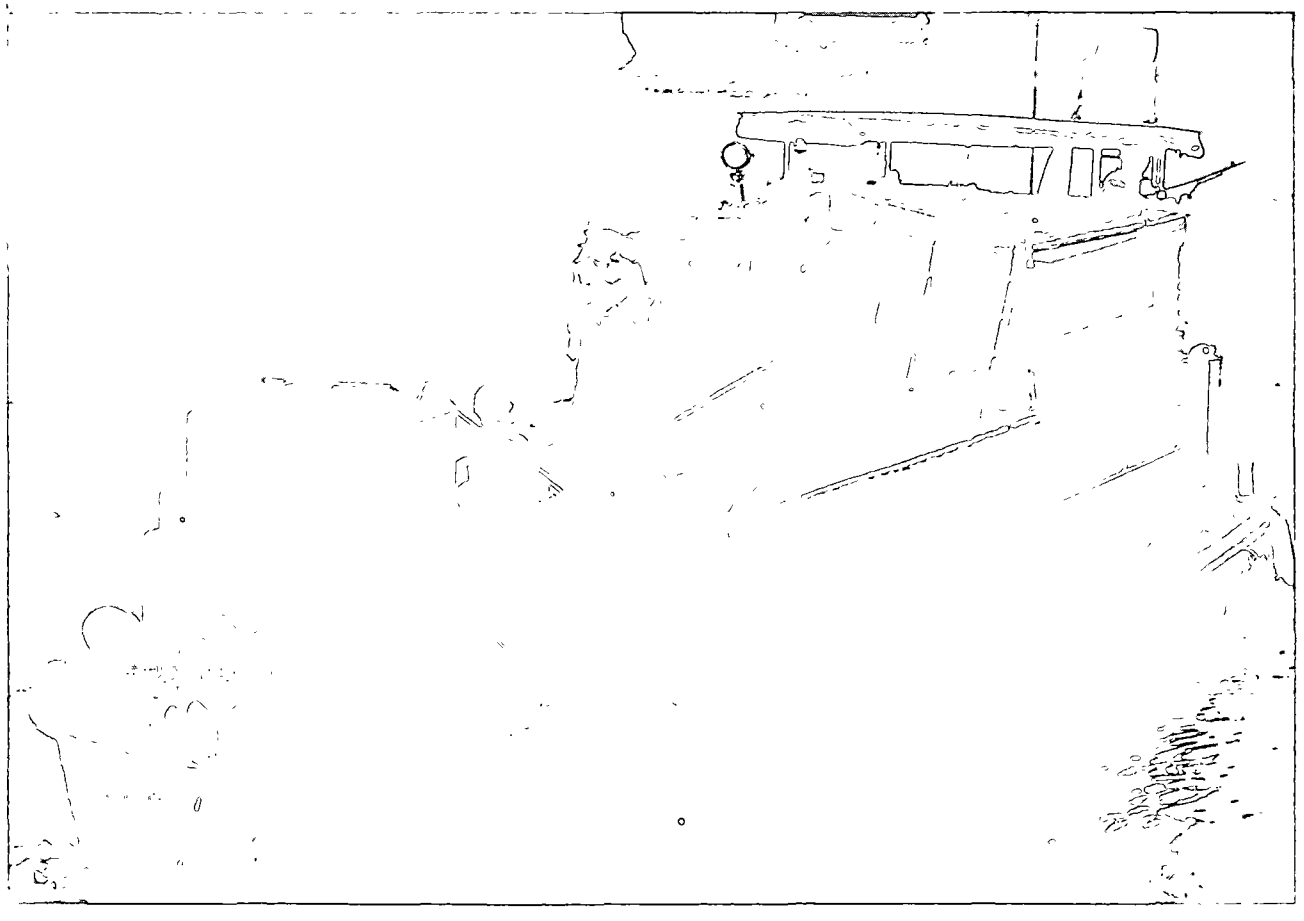


Figure B–33. Commandament.

Speed:	8 knots maximum (6 knots maximum sustained)
Engines:	2 diesels (GM6–71)
Crew:	7
Capacity:	
Cargo:	30 tons
Personnel:	90 (combat equipped) plus crew
Armament:	
3 20-mm single mounts	
2 .50-caliber machineguns	
Armor protection:	Yes
Miscellaneous:	
Bow ramp width:	9 feet 6 inches
Cargo space:	9 feet 6 inches by 31 feet

af. Commandament.

(1) *General characteristics.* The commandament is a converted LCM for use as a command boat for riverine operations.

(2) *Specific data.*

Length:	65 feet 5 inches
Width:	14 feet
Draft:	4 feet 6 inches
Weight:	65 tons
Speed:	8 knots maximum (6 knots maximum sustained)
Engines:	2 diesels (GM6–71)
Crew:	10
Armament:	2 20-mm single mounts
Armor protection:	Yes

ag. Monitor.

(1) *General characteristics.* The monitor is a converted LCM(6) designed for fire support of riverine operations.

(2) *Specific data.*

Length:	56 feet
Width:	14 feet 6 inches
Draft:	4 feet
Weight:	56.5 tons
Speed:	8 knots maximum (6 knots maximum sustained)
Engines:	2 diesels (GM6–71)
Crew:	10
Armament:	
1 40-mm single mount	
2 20-mm single mounts	

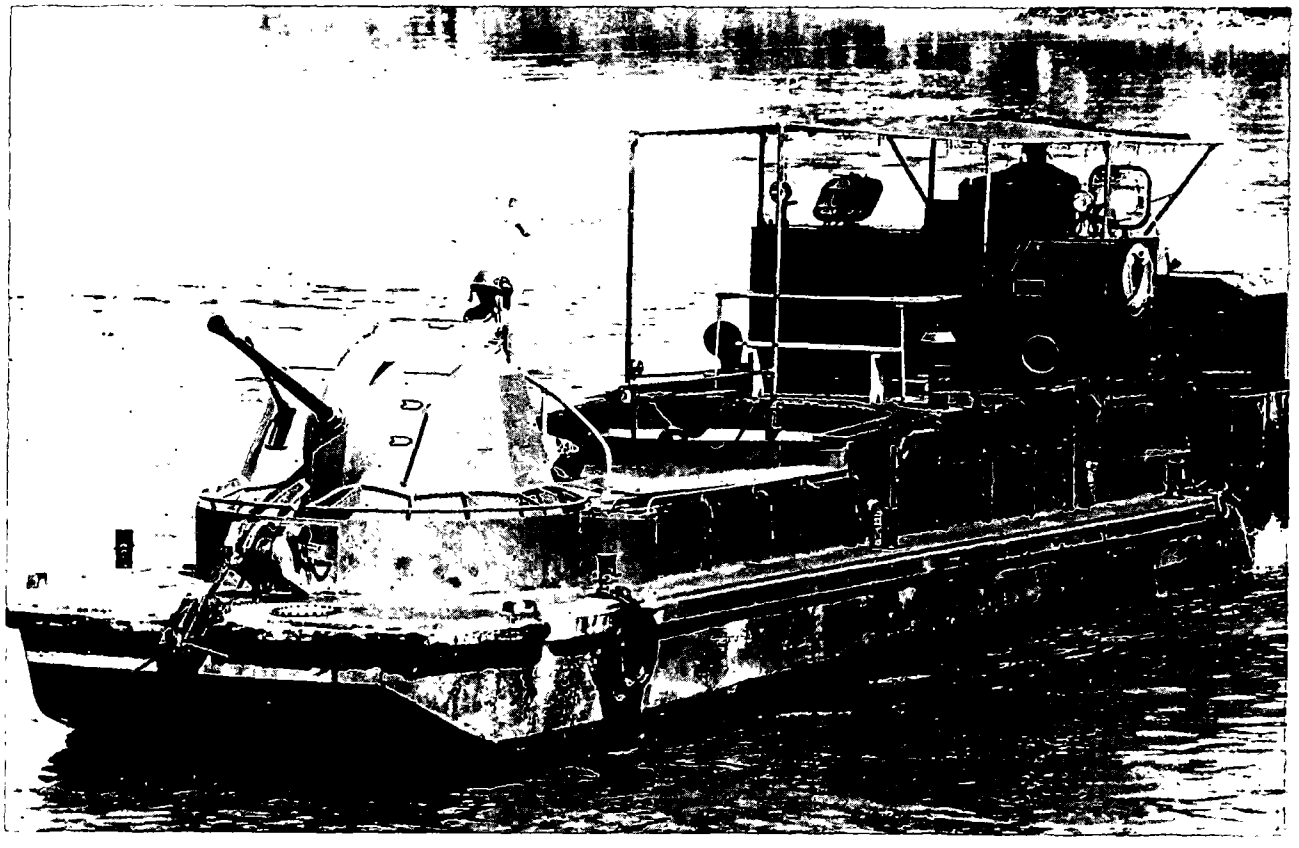


Figure B–34. Monitor.

Figure B–35. FOM/STCAN.

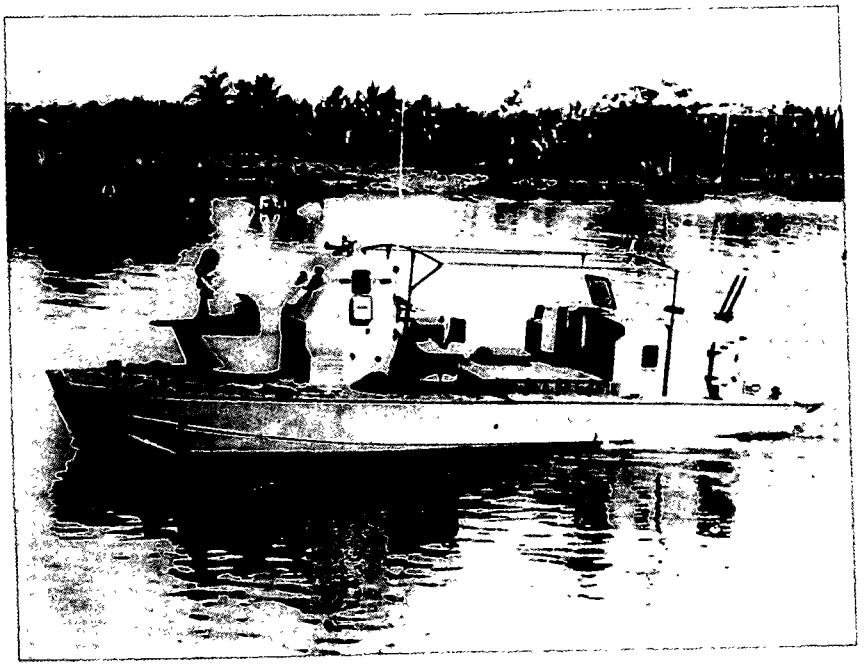


Figure B–36. River patrol craft (RPC).

1 .50-caliber machinegun	
1 81-mm mortar	
Armor protection:	Yes

ah. FOM/STCAN.

(1) *General characteristics.* The FOM/STCAN, a French-designed boat with a V-bottom, performs inland waterway patrol, escort, and gunfire support missions.

(2) *Specific data.*

Length:	34 feet 9 inches
Width:	9 feet 10 inches
Draft:	3 feet
Weight:	13 tons
Speed:	10 knots maximum 8 knots maximum sustained)
Engines:	1 diesel (GM6–71)
Crew:	8
Armament:	
1 .50-caliber machinegun	
3 .30-caliber machinegun	
Armor protection:	Yes
Miscellaneous:	Some are equipped with grapnel and chain drag minesweeping equipment

ai. River Patrol Craft.

(1) *General characteristics.* The river patrol craft (RPC), designed for river patrol and escort operations, has an inverted V-bottom and is the fastest boat in the South Vietnamese river assault group. It has excellent beaching and retracting characteristics.

(2) *Specific data.*

Length:	36 feet
Width:	10 feet 10 inches
Draft:	3 feet 6 inches
Speed:	15 knots maximum (13 knots maximum sustained)
Weight:	26,000 pounds
Engines:	2 diesels (GM6–71)
Crew:	3 to 5
Capacity:	17 personnel including crew
Armament:	
2 .50-caliber machinegun twin mounts	
2 .30-caliber machinegun single mounts (on early boats)	
Armor protection:	None

aj. Command Junk.

(1) *General characteristics.* Command junk is the largest and fastest of the junks used by the South Vietnamese coastal force.

(2) *Specific Data.*

Length:	54 feet 8 inches
Width:	16 feet 5 inches
Draft:	4 feet 7 inches
Weight:	25 tons
Speed:	12 knots maximum (10 knots maximum sustained)
Engines:	1 diesel (GM6–71)
Crew:	10
Capacity:	
Weight:	19.4 tons
Personnel:	25 (combat equipped) plus crew

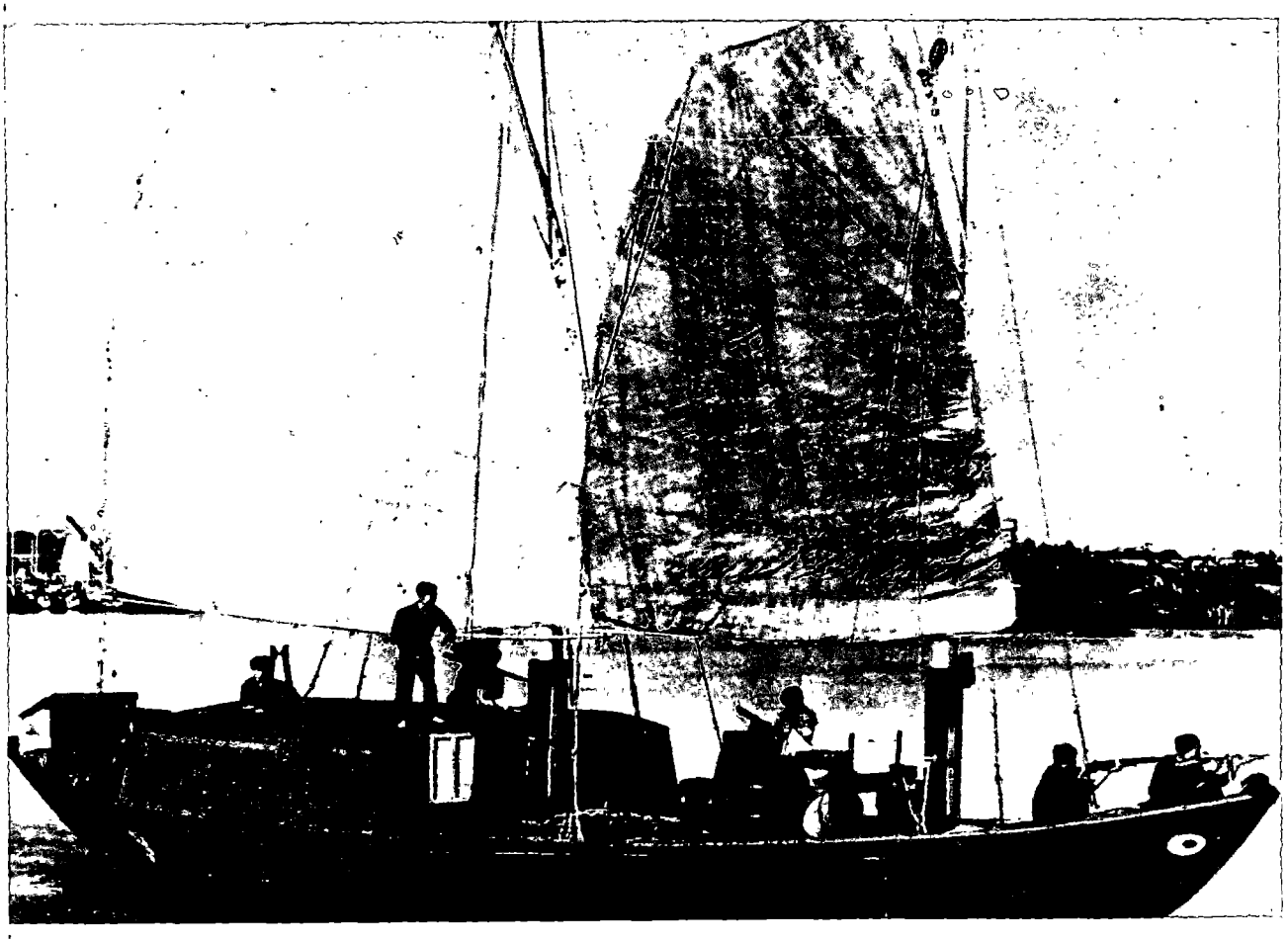


Figure B–87. Command junk.

Armament:	1 .30-caliber machinegun
1 .50-caliber machinegun	
	Armor protection: None

Section II. ARMY RIVERINE EQUIPMENT AND CHARACTERISTICS

B–5. Organic Equipment

a. The following equipment is organic to a typical infantry division engineer battalion operating in a riverine area, when equipped with mobile assault bridge equipment:

Nomenclature	*Quantity*
Boat, landing, inflatable, assault craft, nylon cloth, 15-men	18
Boat, reconnaissance, pneumatic, 3-man	28
Bridge, floating, mobile assault, 36-foot	16
Bridge, floating raft, section, light tactical	2
Combat engineer vehicle	4
Ferry conversion set, raft	2
Outboard motor, 25 horsepower	8

b. The following equipment is organic to a typical infantry division engineer battalion operating in a riverine area, when equipped with M4T6-class 60 bridge equipment:

Nomenclature	*Quantity*
Boat, bridge erection, 27 feet long	8
Boat, landing, inflatable, assault craft, nylon cloth, 15-man	18
Boat reconnaissance, pneumatic, 3-man	28
Bridge, floating, highway, aluminum deck balk	4
Bridge, floating, highway, class 60, 135 feet	4
or	
Bridge, steel, floating, class 60	4
Bridge, floating, raft section, light tactical	2
Combat engineer vehicle	4
Ferry conversion set, infantry support	2
Outboard motor, 25 horsepower	8

B–6. Other Army Equipment

The Army units operating in a riverine area require the following additional supplies and equipment:

a. Aluminum footbridge (for light cargo, light vehicle, and wounded personnel).

b. Assault boat, plastic, 16-foot.

c. Can, water, collapsible, plastic, 5-gallon.

d. Mat, beaching, woven steel wire.

e. Mat, beaching, 4-ply, heavy duty.

f. Membrane surfacing, filament nylon yarn, woven.

(1) 3 feet by 100 feet.

(2) 3 feet by 180 feet.

h. Rope, nylon, 1⅛ inches in circumference, 3,000-pound breaking strength.

i. Outboard motor, 40-horsepower.

j. Thermocompression-type equipment for water distillation, skid or trailer mounted.

k. Landing vehicle, tracked, engineer (LVTE).

Figure B–38. Airboat.

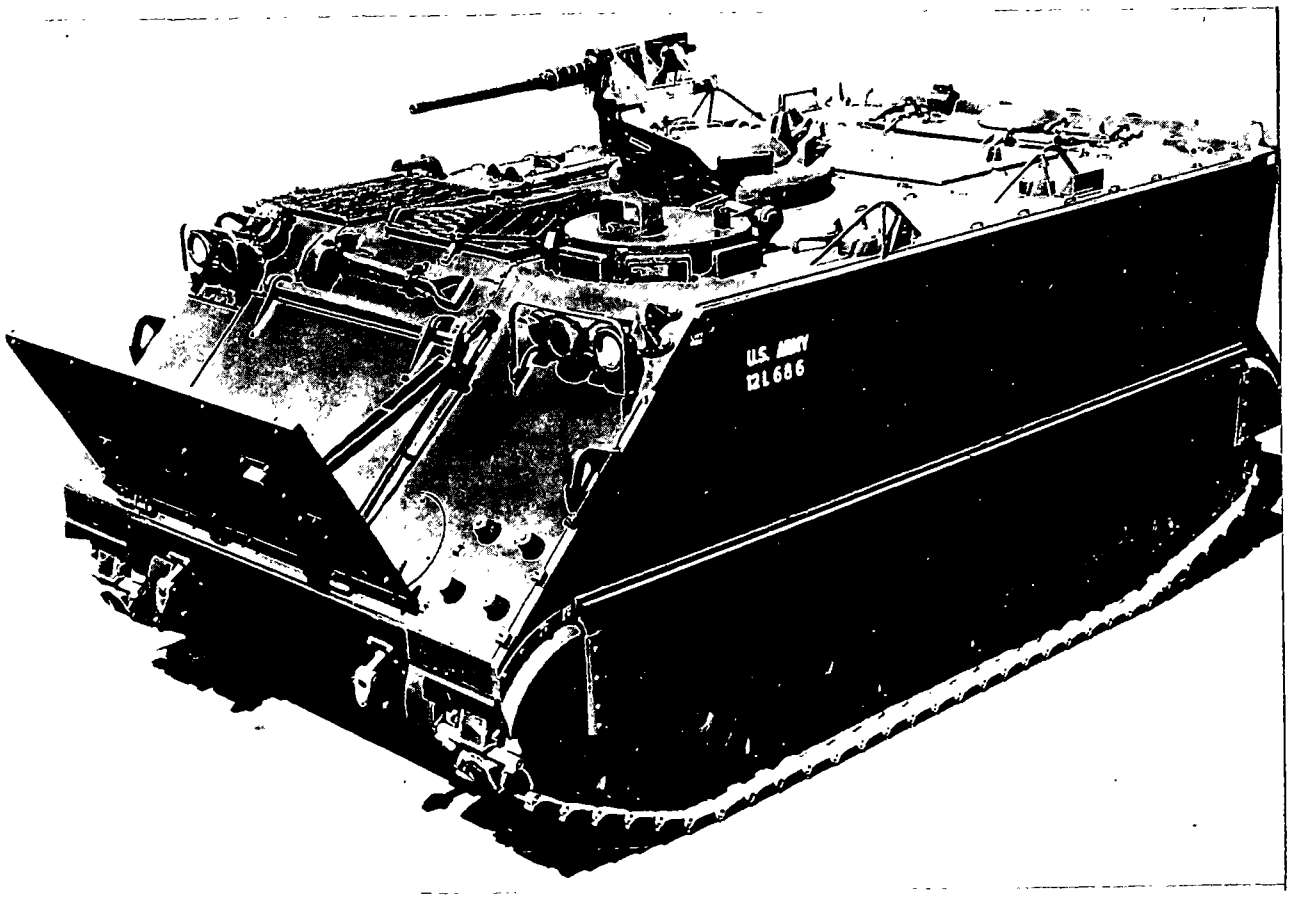


Figure B–39. APC, M113A1.

l. Canal bridge for troops.
m. Four-man lightweight fabric boat.
n. Lightweight flotation gear.
o. Grapnel with line (propelled).
p. Portable artillery firing platform.
q. Air-transportable troop platform.

B–7. Equipment Characteristics and Data

a. Airboat (Hurricane Aircat).

(1) *General characteristics.* The airboat is a military version of the commercial Hurricane Aircat. Its construction is of molded fiber glass with a semicatamaran force and a flat bottom aft, hull shape. A 180-horsepower Lycoming engine drives a propeller mounted on the stern. The airboat can operate in water as shallow as 2.5 to 5 centimeters, traverse swamp vegetation, and cross dikes up to .6 meters high. Airboats provide transportation for patrolling, reconnaissance, and flank security missions on inland waterways and inundated areas. Airboats combine with helicopters and other watercraft in performing these missions. A limiting feature is the very high operating noise level.

(2) *Specific data.*

Length:	17 feet
Width:	7 feet 3 inches
Weight:	1,150 pounds without load
Capacity:	
Personnel:	5 to 8
Cargo:	1,000 pounds
Speed:	38 miles per hour (33 knots)
Draft:	1 to 2 inches minimum
Vertical obstacle:	24-inch dike at 20 miles per hour
Armor protection:	None
Armament:	1 .30-caliber or 7.62-mm machinegun 1 40-mm grenade launcher individual weapons of crew

b. APC; M113A1.

(1) *General characteristics.* The M113 APC is a lightweight, armored, airdroppable,

full-tracked vehicle designed to transport personnel (squad) and cargo. It is capable of water operations on inland lakes and streams, extended cross-country travel over rough terrain, and high speed over improved roads. This vehicle has limited mobility in marshy terrain and a limited capability to negotiate riverbanks and canal banks without aid. The M113 provides armor protection against small arms and shell fragments. Several special purpose vehicles that use the basic M113 chassis also are available. They include the M106 armored self-propelled 107-mm mortar; M125 armored self-propelled 81-mm mortar; M132 armored self-propelled flamethrower; M577 armored command post; M548 unarmored cargo carrier; and M696 unarmored recovery vehicle. A bulldozer kit, crane attachment, and bridge launcher attachments also are available. An "A1" added to the basic model number of a vehicle in the M113 family denotes a diesel engine.

(2) *Specific data.*

Length:	191½ inches
Width:	105¾ inches
Height:	
Overall:	98¼ inches
Reducible:	79½ inches
Weight:	
Net:	20,870 pounds
Combat:	24,080 pounds
Capacity:	
Crew:	1
Troops:	12
Cargo weight:	3,210 pounds
Cargo space:	110 by 96½ by 49½ inches
Speed:	
Improved roads:	42.5 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	3.6 miles per hour
Range:	305 miles (500 kilometers) on land
Gradability:	
Forward slope:	60 percent
Side slope:	30 percent

Figure B–40. Armored reconnaissance/airborne assault vehicle, M551.

Ground clearance:	16 inches
Vertical obstacle:	24 inches
Trench crossing:	66 inches
Turning radius:	13 feet
Ground pressure:	
With payload:	7.6 psi
Net weight:	6.6 psi
Fording depth:	Floats
Armor protection:	Aluminum (small arms)
Armament:	1 .50-caliber machinegun

c. Armored Reconnaissance/Airborne Assault Vehicle, M551 (AR/AAV) (General Sheridan).

(1) *General characteristics.* The M551 Sheridan weapon system is a lightweight, air-transportable, airdroppable, armored reconnaissance and assault vehicle. It has a maximum speed of more than 40 miles per hour, has good cross-country mobility over difficult terrain, and can swim on inland waterways. A barrier, used when swimming, can be erected in 1½ minutes to protect the vehicle against water wash above the basic hull height. The vehicle operates effectively at night and under conditions of low visibility. The General Sheridan performs reconnaissance and security missions as part of combined arms teams and may be the main assault weapon for them. It can provide fire support in rough terrain and participate in airdrop or vertical envelopment operations. Its 152-mm dual purpose cannon fires either conventional ammunition or the Shillelagh guided missile. The multipurpose conventional round is effective against armor, troops, and fortifications.

(2) *Specific data.*

Length:	248 inches
Width:	110 inches
Height:	
Overall:	116 inches
Reducible:	95½ inches
Weight:	33,600 pounds combat loaded
Crew:	4
Speed:	
Land:	43.5 miles per hour
Water:	3.5 miles per hour
Range:	373 miles
Maximum grade:	40 to 60 percent depending on surface
Ground clearance:	19 inches
Turning radius:	Pivot
Ground pressure:	6.8 psi
Fording depth:	Floats
Freeboard:	24 inches
Armor protection:	
Turret:	Steel
Hull:	Aluminum
Armament:	
Primary:	Gun launcher for 152-mm conventional ammunition or Shillelagh missile
Secondary:	.50-caliber machinegun 7.62-mm coaxially mounted machinegun Grenade projector system

d. Armored Personnel Carrier, Launched Bridge.

(1) *General characteristics.* The lightweight marginal terrain assault bridge mounts on and launches from an M113A1 APC. The bridge consists of four tapered box sections pinned together at the hinges to form a treadway. Construction is of weldable aluminum alloy, and employment is possible where heavier equipment would bog down. It is particularly useful in delta-type riverine areas for crossing canals and steep-sided irrigation and drainage ditches. The bridge is 269 centimeters wide and will support class 12 loads over gaps up to 10.5 meters. Operation is by hydraulic power; and emplacement time is less than 2 minutes, from its mounting on the M113 without exposing personnel to enemy fires. Retrieval of the bridge is possible in 10 minutes by reversing the launching procedure. The total weight and ground pressure of the combined transporter/launcher and bridge are slightly less than that of the combat-loaded basic M113A1 APC. The addition of the launcher and bridge does not detract appreciably from mobility of the basic vehicle on land or in water. The M113 launched bridge is an improvement over the M113 launched deck balk bridge, which also is available. The deck balk bridge is built from 10 sections of M4 balk carried on two APC and launched by one of the carriers fitted with a field-fabricated H-boom. The balk bridge takes 12 minutes to install compared with less than 2 minutes for the new assault bridge.

(2) *Specific data.*

Length:	209½ inches
Width:	123½ inches
Height:	109¼ inches
Weight:	
Vehicle and launcher	21,030 pounds
Bridge:	2,750 pounds

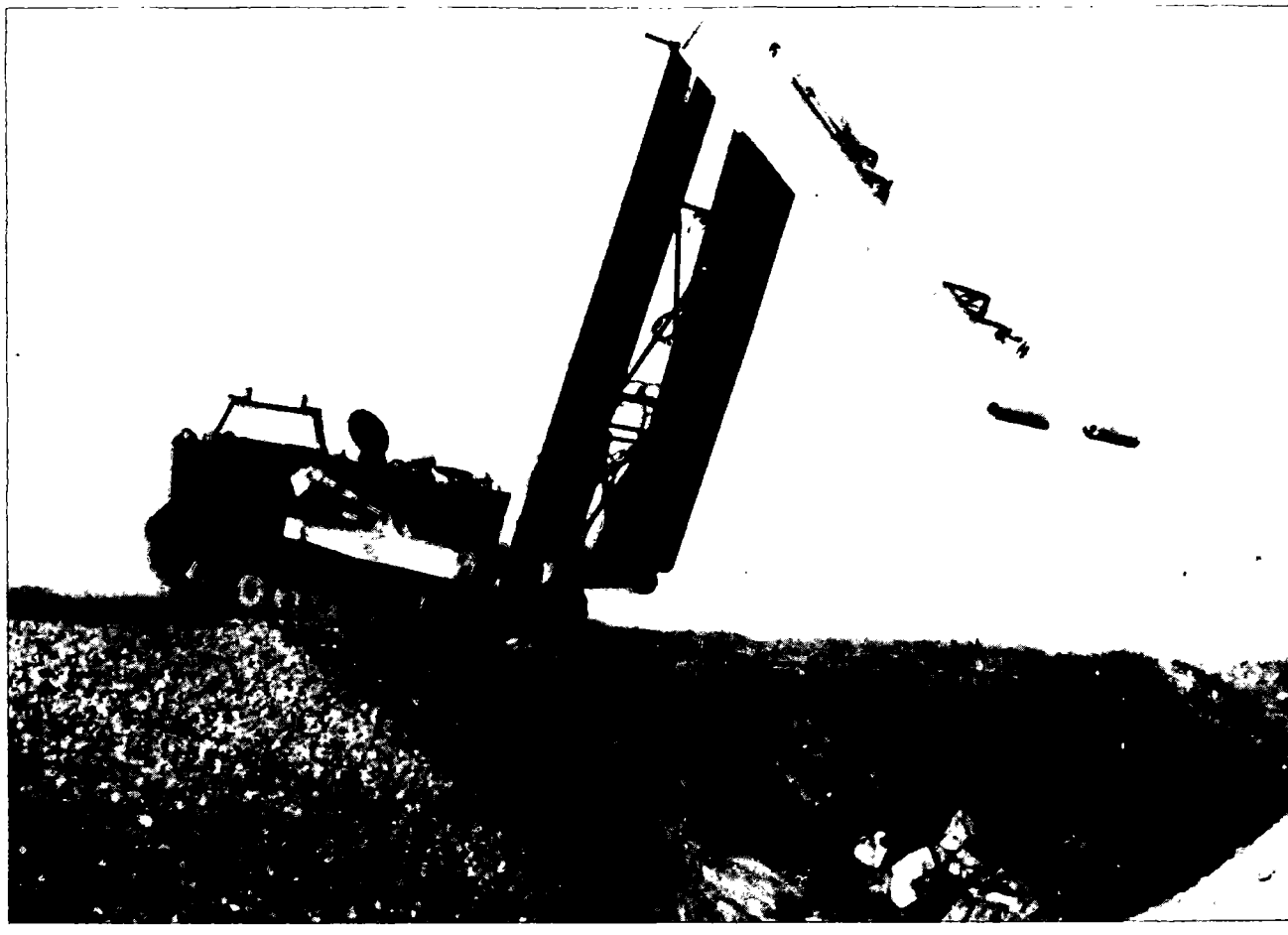


Figure B–41. Armored personnel carrier launched bridge.

Gross:	23,780 pounds
Crew:	2

Other characteristics are similar to those of basic M113A1 APC

e. Armored Self-Propelled 81-mm Mortar, M125A1.

(1) *General characteristics.* The M125A1 armored self-propelled mortar is a lightweight, full-tracked, amphibious vehicle, which carries an 81-mm mortar. The M125A1 is an adaptation of the M113 personnel carrier and uses suspension and power train components common to those of the M113 family of vehicles. Like the M113, the M125A1 is capable of operations across lakes and streams, extended cross-country travel over rough terrain, and high speed over improved roads. The 81-mm mortar has 360° traverse. The vehicle retains the basic M113 silhouette, the main difference being the welded-in mortar beam and a three-part circular hatch cover on the M125A1.

(2) *Specific data.*

Length:	191½ inches
Width:	105¾ inches
Height:	
Overall:	98¼ inches
Reducible:	78½ inches
Weight:	24,550 pounds combat
Crew:	6
Speed:	
Improved roads:	42.5 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	3.6 miles per hour
Range:	300 miles (483 kilometers)
Gradability:	
Forward slope:	60 percent
Side slope:	30 percent
Ground clearance:	16 inches
Vertical obstacle:	24 inches

Trench crossing:	66 inches
Turning radius:	13 feet
Ground pressure:	7.8 psi at combat weight
Fording depth:	Floats
Armor protection:	Aluminum
Armament:	81-mm mortar with 114 rounds ammunition 1 .50-caliber machine-gun

f. Armored Self-Propelled 107-mm Mortar, M106A1.

(1) *General characteristics.* The M106A1 armored self-propelled mortar is a lightweight, full-tracked, amphibious vehicle, which carries a 107-mm (4.2-inch) mortar. The M106A1 is an adaptation of the M113 personnel carrier and uses suspension and power train components common to those of the M113 family of vehicles. Like the M113, the M106A1 is capable of operations across lakes and streams, extended cross-country travel over rough terrain, and high speed over improved roads. The rear-firing 107-mm (4.2-inch) mortar has a 90° traverse. The vehicle retains the basic M113 silhouette, the main difference being the welded-in mortar beam and a three-part circular hatch cover on the M106A1.

(2) *Specific data.*

Length:	194 inches
Width:	112¾ inches
Height:	
Overall:	98¼ inches
Reducible:	78½ inches
Weight:	26,140 pounds combat loaded

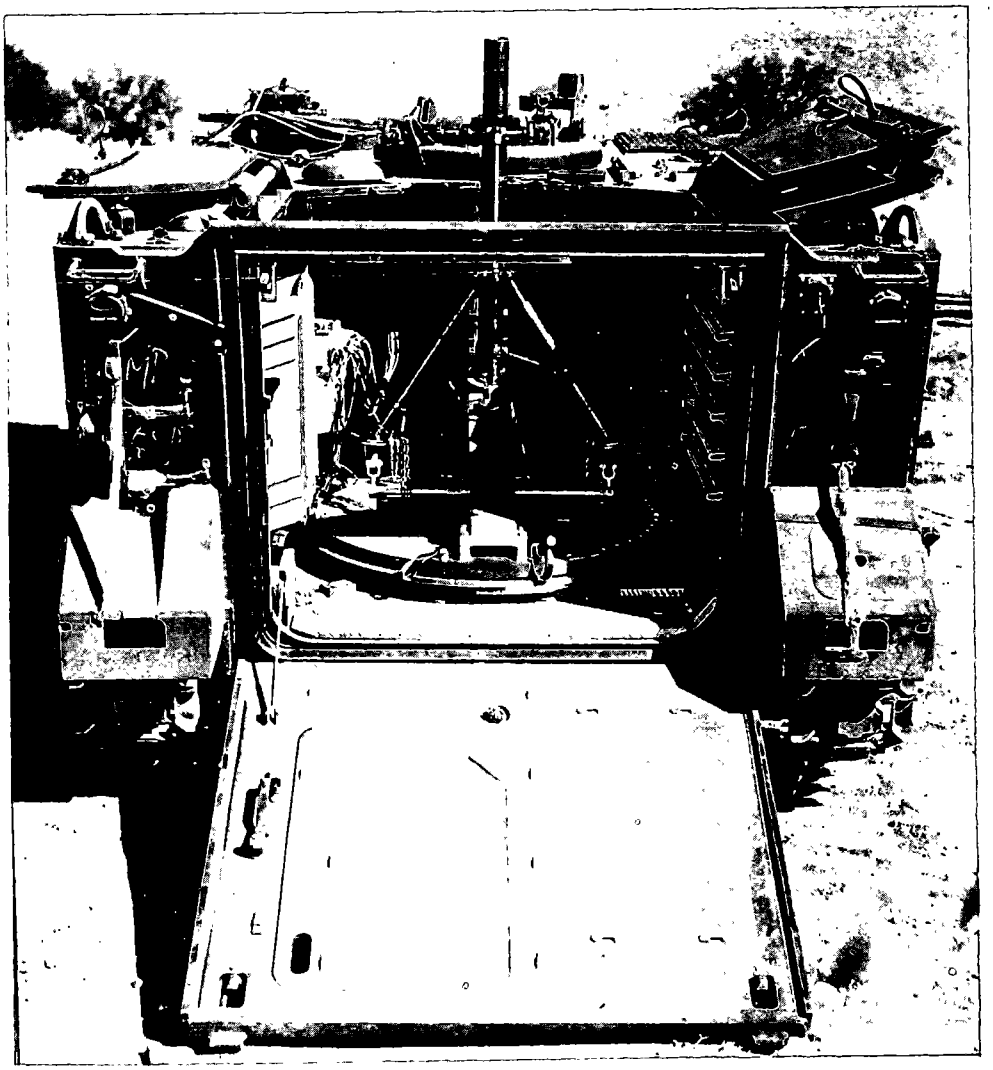


Figure B–42. Armored self-propelled 81-mm mortar, M125A1.

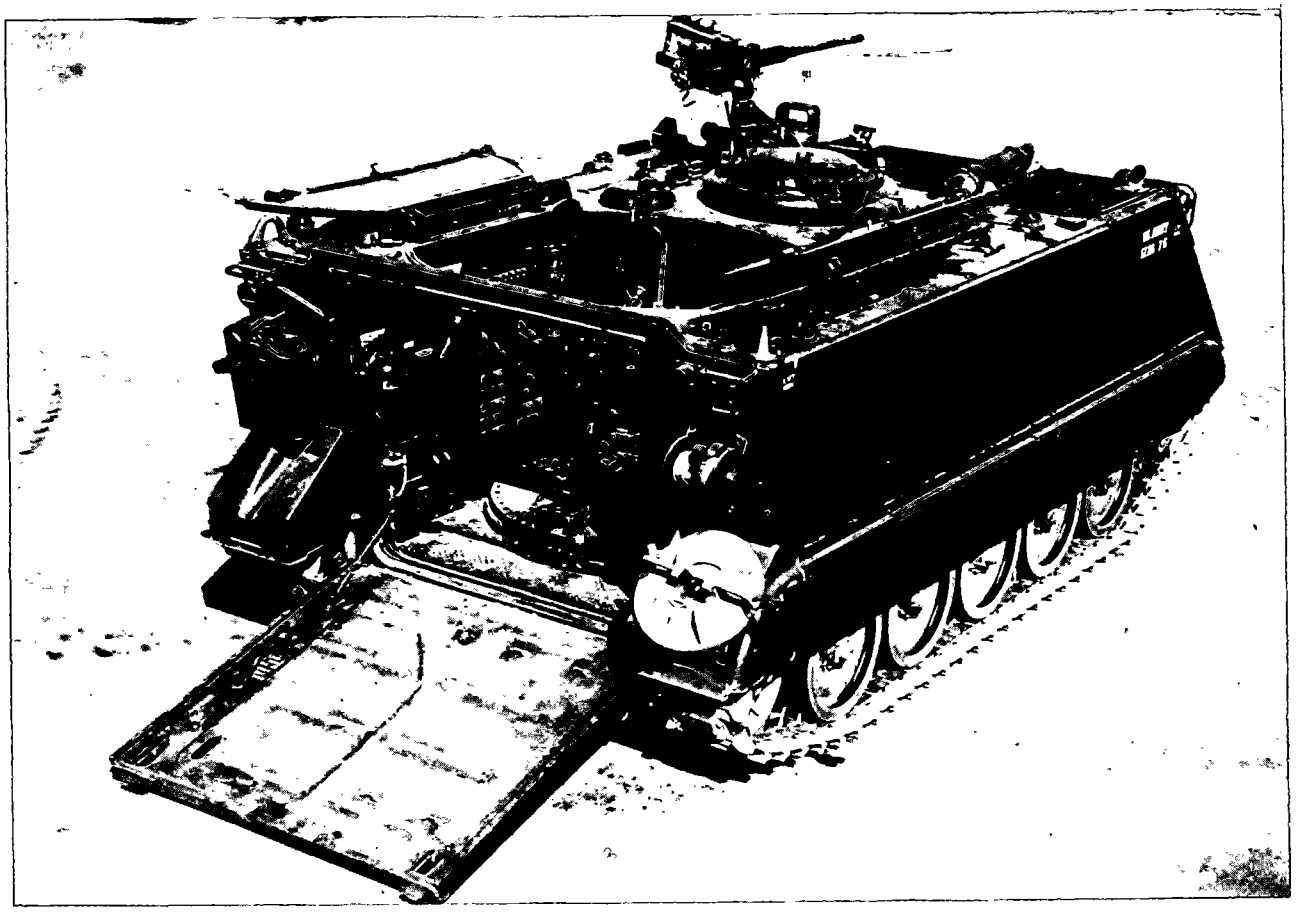


Figure B–43. Armored self-propelled 107-mm mortar, M106A1.

Crew:	6
Speed:	
Improved roads:	41.5 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	3.5 miles per hour
Range:	295 miles (475 kilometers) on land
Gradability:	
Forward slope:	60 percent
Side slope:	30 percent
Ground clearance:	16 inches
Vertical obstacle:	24 inches
Trench crossing:	66 inches
Turning radius:	13 feet
Ground pressure:	8.3 psi at combat weight
Fording depth:	Floats
Armor protection:	Aluminum
Armament:	107-mm (4.2-inch) mortar with 88 rounds ammunition
	1 .50-caliber machine-gun

g. Armored Command and Reconnaissance Carrier, M114.

(1) *General characteristics.* The M114 armored command and reconnaissance carrier is a lightweight, low silhouette, tracked vehicle designed for security, command, and reconnaissance missions. It can operate over unimproved roads and trails, soft marsh, inland waterways, loose sand, rocky areas, and hilly country, as well as snow, ice, unfrozen tundra, and muskeg, under all seasonal conditions in artic, temperate, and tropical climates. Movement of the tracks propels and steers the vehicle on both land and water.

(2) *Specific data.*

Length:	175¾ inches
Width:	91¾ inches
Height:	
Overall:	91⅛ inches
Reducible:	74½ inches
Weight:	14,749 pounds (combat)
Crew:	3
Speed:	
Land:	34 miles per hour

Water:	3.8 miles per hour
Range:	300 miles
Maximum grade:	60 percent
Ground clearance:	14¼ inches
Vertical obstacle:	18 inches
Trench crossing:	60 inches
Turning radius:	32 feet
Ground pressure:	4.63 psi
Fording depth:	Floats
Freeboard:	12 inches
Armor protection:	Aluminum
Armament:	1 7.62-mm machinegun 1 .50-caliber machinegun

h. Amphibious Cargo Carrier, M116.

(1) *General characteristics.* The M116 amphibious cargo carrier is a lightweight, low silhouette, tracked vehicle designed to transport cargo and personnel. It is capable of operation over unimproved roads and trails, soft marsh, inland waterways, loose sand, rocky areas, and hilly country, as well as snow, ice, unfrozen tundra, and muskeg, under all seasonal conditions in artic, temprate, and tropical climates. Movement of the tracks propels and steers the vehicle on both land and water.

(2) *Specific data.*

Length:	188½ inches
Width:	82½ inches
Height:	
Overall:	80 inches
Reducible:	63¼ inches
Weight:	7,750 pounds net
Capacity:	
Crew:	1
Troops:	13
Cargo:	3,000 pounds
Speed:	
Land:	37 miles per hour
Water:	3.7 miles per hour
Range:	300 miles on land
Maximum grade:	60 percent
Ground clearance:	15½ inches
Vertical obstacle:	18 inches
Trench crossing:	58 inches
Turning radius:	Pivot

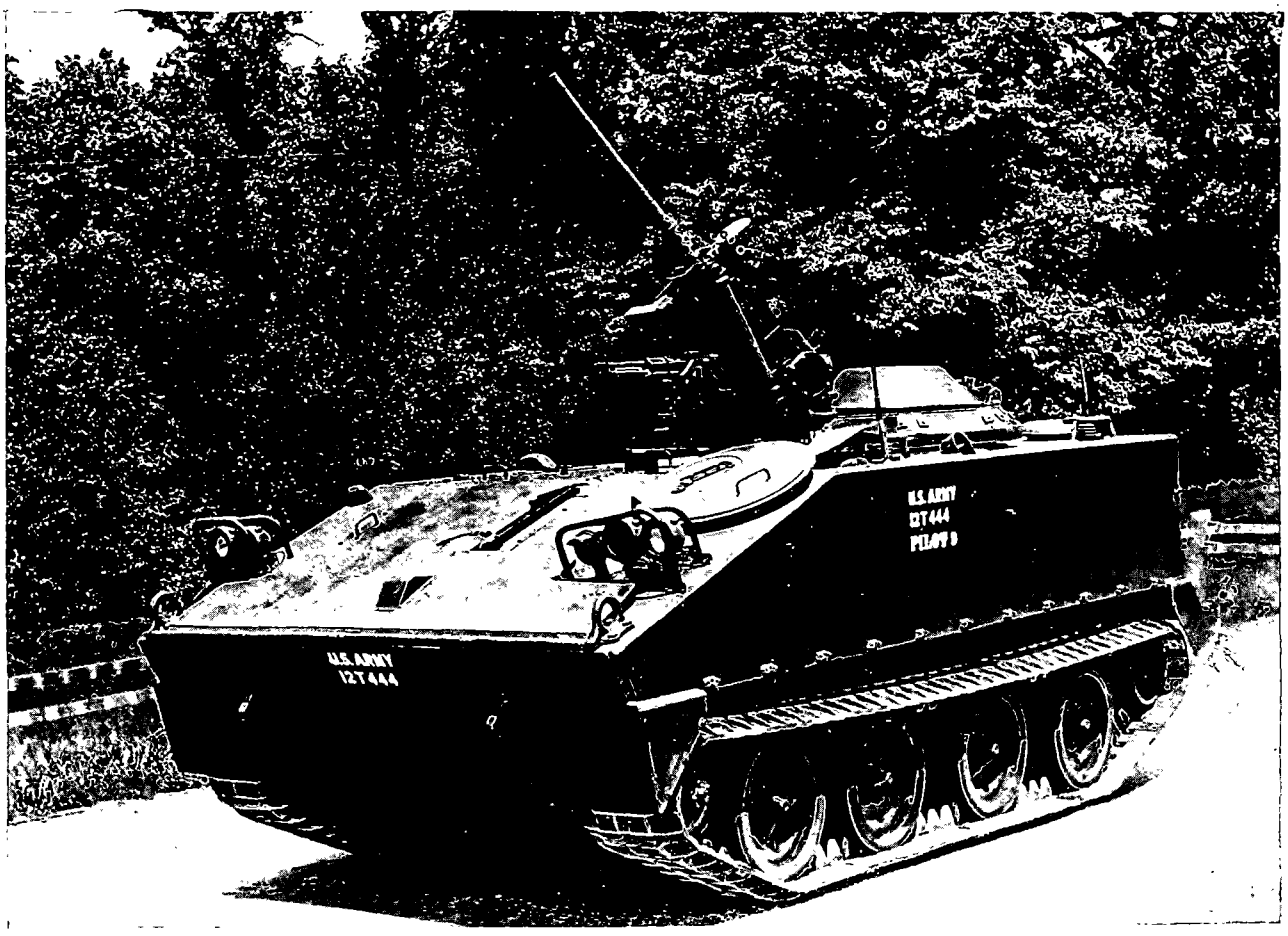


Figure B–44. Armored command and reconnaissance carrier, M114.

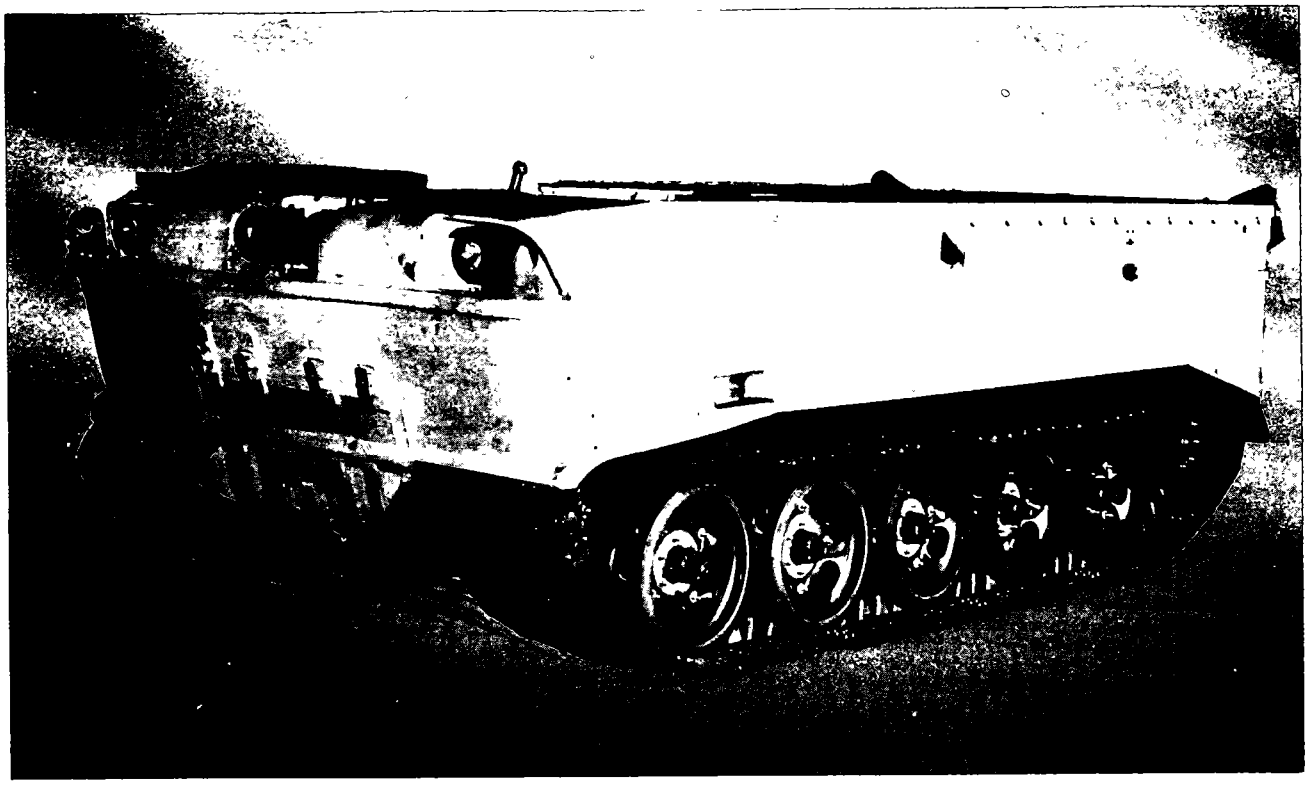


Figure B–45. Amphibious cargo carrier, M116.

Ground pressure:	
With payload:	2.69 psi
Net weight:	1.88 psi
Fording depth:	Floats
Freeboard:	12 inches
Armor protection:	None on basic model; armor protection against .30-caliber rounds may be added at an additional weight of 400 pounds
Armament:	None on basic model; M60 machinegun and 1,800 rounds of ammunition may be added at an additional weight of 248 pounds

i. Amphibious Assault Vehicle, XM733.

(1) *General characteristics.* The XM733 amphibious assault vehicle is designed for use as an armored weapons or personnel carrier in remote swampy areas. The XM733 is a standard M116 amphibious cargo carrier with armor plates bolted to the front, sides, and hull of the vehicle for protection. It has three pintle mounts for M60 machineguns, one in the front center and one on each side of the rear compartment. A ring-mounted .50-caliber machinegun or an 81-mm mortar can be installed in the cargo compartment. The vehicle has a forward compartment for the crew and a rear compartment for carrying troops and cargo. A large watertight door swings downward from the rear for loading and unloading. When this vehicle has a mortar-firing capability, it is designated carrier, tracked, 81-mm mortar, XM755.

(2) *Specific data.*

Length:	195 inches
Width:	81½ inches
Height:	
Overall:	78 inches
Reducible:	68¼ inches
Weight:	10,500 pounds or 12,500 pounds with 81-mm mortar kit
Capacity:	
Crew:	2 or 3
Troops:	5 normal; 13 overload
Cargo:	1,000 pounds normal; 3,000 pounds overload

Figure B–46. Amphibious assault vehicle, XM733.

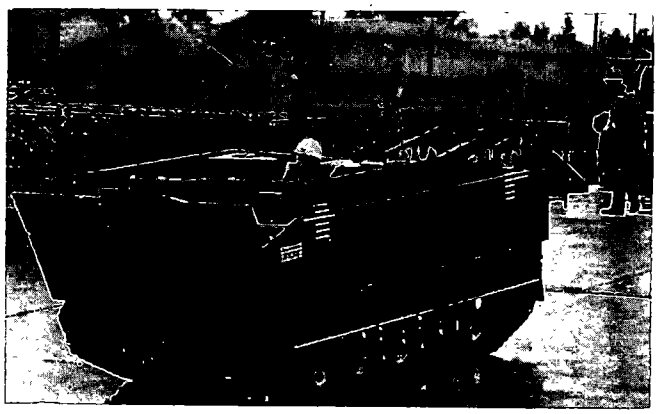


Figure B–47. Carrier, tracked, 81-mm mortar, XM755.

Speed:	
Land:	35 miles per hour
Water:	3.5 miles per hour
Range:	
Roads:	260 miles
Cross-country:	175 miles
Water:	22 miles
Maximum grade:	60 percent
Vertical obstacle:	18 inches
Trench crossing:	58 inches
Turning radius:	Pivot
Ground pressure:	
Normal:	2.6 psi
Overload:	3.0 psi
Fording depth:	Floats
Freeboard:	
Normal:	12 inches
Overload:	8 inches
Armor protection:	Aluminum
Armament:	
Front:	1 7.62-mm machinegun
Rear:	2 7.62-mm machinegun
and	1 .50-caliber machinegun
or	1 81-mm mortar

j. Recovery Vehicle, Full-Tracked, M696.

(1) *General characteristics.* The M696 recovery vehicle is a lightweight, unarmored, full-tracked, amphibious vehicle for repair and recovery of vehicles up to 15 tons. The suspension and power train components are common to those of the M113 family of vehicles. The M696 is capable of operations across lakes and streams, extended cross-country travel over rough terrain, and high speed over improved roads. The M696 is an adaptation of

the M548 cargo carrier and uses the standard 5-ton M543 crane and its on-vehicle equipment. The hydraulic tow winch has two speeds, and the cable can be payed out under power. To increase lateral stability, outriggers are installed and adjusted to the terrain. Spades may be manually attached to sockets in the rear of the vehicle to prevent back slipping of heavy winch loads.

(2) *Specific data.*

Length:	263 inches
Width:	107¾ inches
Height:	114 inches
Weight:	26,630 pounds gross
Crew:	2
Lifting capability:	5 tons at 33 inches from rear of vehicle, 2-part line; 2 tons at 129 inches from rear of vehicle, 2-part line; 10 tons at 33 inches from rear of vehicle, 4-part line
Speed:	
Improved roads:	38 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	4 miles per hour
Range:	300 miles on land
Gradability:	
Forward slope:	60 percent
Side slope:	30 percent
Ground clearance:	16 inches
Vertical obstacle:	24 inches
Trench crossing:	77 inches
Turning radius:	14 feet
Ground pressure:	8 psi
Fording depth:	Floats
Armor protection:	None
Armament:	None

k. Dong Nai Swimmer Support Boat.

(1) *General characteristics.* The swimmer support boat (SSB) is constructed of bonded polystyrofoam planks covered with fiber glass. It can operate in moderately rough and vegetated waters, with a draft of 0.3 meter without engine or 0.6 meter with engine. Insufficient freeboard allows craft to take on water when in a slight chop. Six men can manhandle this craft during difficult portage operations.

(2) *Specific data.*

Length:	14 feet 3 inches
Width:	6 feet 10 inches
Height:	24 inches
Weight:	375 pounds
Capacity:	
Weight:	2,100 pounds

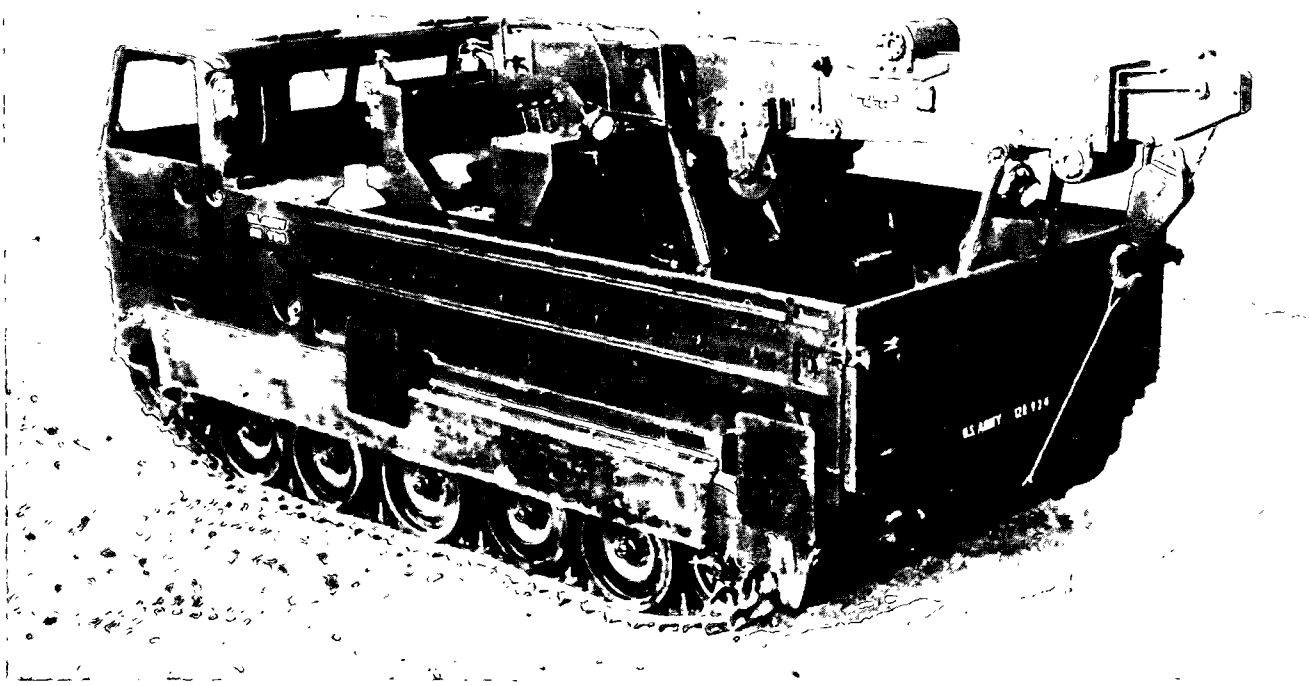


Figure B–48. Recovery vehicle, M696.

Figure B–49. Dong Nai swimmer support boat (SSB).

Figure B–50. Three fire team assault boats joined.

Personnel:	14 including crew, at 150 pounds per man
Speed:	25.5 miles per hour no load; 17 miles per hour using 40-horsepower outboard motor
Range:	50 miles (estimated)
Armor protection:	None
Armament:	None

l. Fire Team Assault Boat, MK–II (FTAB).

(1) *General characteristics.* The U.S. Marine Corps developed the fire team assault boat (FTAB) for use in riverine operations. The FTAB is constructed of fiber glass with polyurethane foamed in place between the hull and deck. The hull has an inverted V shape with squared off transom. A 33-horsepower Evinrude or 35-horsepower Mercury outboard motor provides power for FTAB. FTAB are joined port and starboard for transporting troops, cargo, light vehicles, and weapons. All weapons organic to an infantry battalion can be fired from floating platforms made up of one or more FTAB. They have good maneuver-

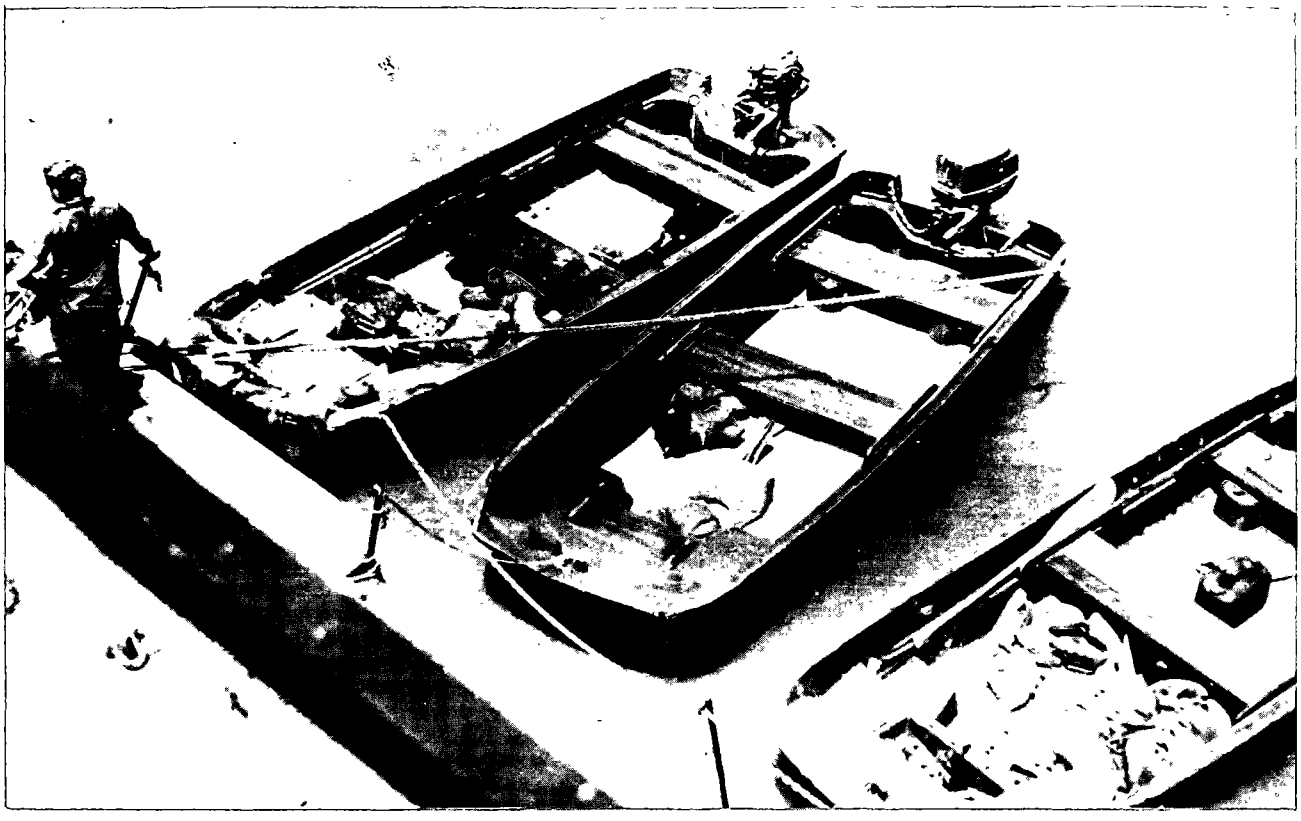


Figure B–51. Boston Whaler.

ability in both open water and water with vegetative growth.

(2) *Specific data.*

Length:	16 feet
Width:	4 feet
Height:	20 inches
Weight:	350 pounds without load
Capacity:	
Personnel:	6, combat loaded
Cargo:	1,500 pounds
Propulsion:	Outboard motor; 4 paddles; 2 poles
Speed:	25 miles per hour with motor
Draft:	2½ inches
Armor protection:	None
Armament:	Receptacle for M60 machinegun pintle
Features:	Can be nested; easily portaged; simple to maintain and repair; noncritical stability; self-bailing; unsinkable; can be joined at port and starboard

m. Boston Whaler.

(1) *General characteristics.* The Boston Whaler is a commercially available skiff, adapted for use in riverine operations. It is constructed of a monolithic casting of rigid, light plastic foam approximately 5 centimeters thick with smooth molded fiber glass crust inside and out. It has a modified spoon bow. The Boston Whaler has excellent buoyancy, maneuverability, resistance to tipping, and is unsinkable. It can be powered by any commercial outboard motor ranging from 40 to 100 horsepower. Maximum speed varies from 22 to 33 knots depending on the motor used.

(2) *Specific data.*

Length:	16 feet 7 inches
Width:	6 feet 2 inches
Transom height:	21 inches
Weight:	500 pounds without load
Capacity:	
Personnel:	7, combat loaded
Cargo:	1,750 pounds
Speed:	25 miles per hour with 40-horsepower motor
Armor protection:	None
Armament:	7.62-mm machinegun can be mounted in bow

n. Articulated Utility Carrier, M571.

(1) *General characteristics.* The M571 utility carrier is a small, lightweight, unarmored, full-tracked, amphibious vehicle with an articulated, tracked rear unit. The rear unit is powered when both units are coupled. The M571 has an average ground pressure of 1.7 to 2.3 psi, providing good mobility in marsh, swamps, and muskeg. The M571 floats and navigates lakes, streams, and slow-moving rivers although trim and stability become critical as the vehicle approaches its design gross weight of 7,450 pounds. The M571 can negotiate moderately inclined, semifirm structured riverbanks and the dikes in rice paddies.

(2) *Specific data.*

Length:	234 inches
Width:	64 inches
Height:	
Overall:	72 inches
Reducible:	56 inches
Weight:	5,940 pounds
Capacity:	
Crew:	2
Troops:	6 to 8
Cargo weight:	Front unit—500 pounds; rear unit—1,500 pounds
Cargo space:	Front unit—12 square feet; rear unit—41 square feet
Speed:	
Roads:	30 miles per hour
Cross-country:	20 miles per hour
Water:	2 miles per hour
Range:	300 miles
Gradability:	
Forward slope:	60 percent
Side slope:	40 percent
Ground clearance:	12 inches
Vertical obstacle:	18 inches
Turning diameter:	36.5 feet
Ground pressure:	2.34 psi maximum
Fording depth:	Floats
Armor protection:	None on basic model; armor protection against .30-caliber rounds may be added at an additional weight of 355 pounds per vehicle
Armament:	None on basic model; M60 machinegun and 1,800 rounds of ammunition may be added at an additional weight of 284 pounds

o. Cargo Carrier, Full-Tracked, M548.

(1) *General characteristics.* The M548

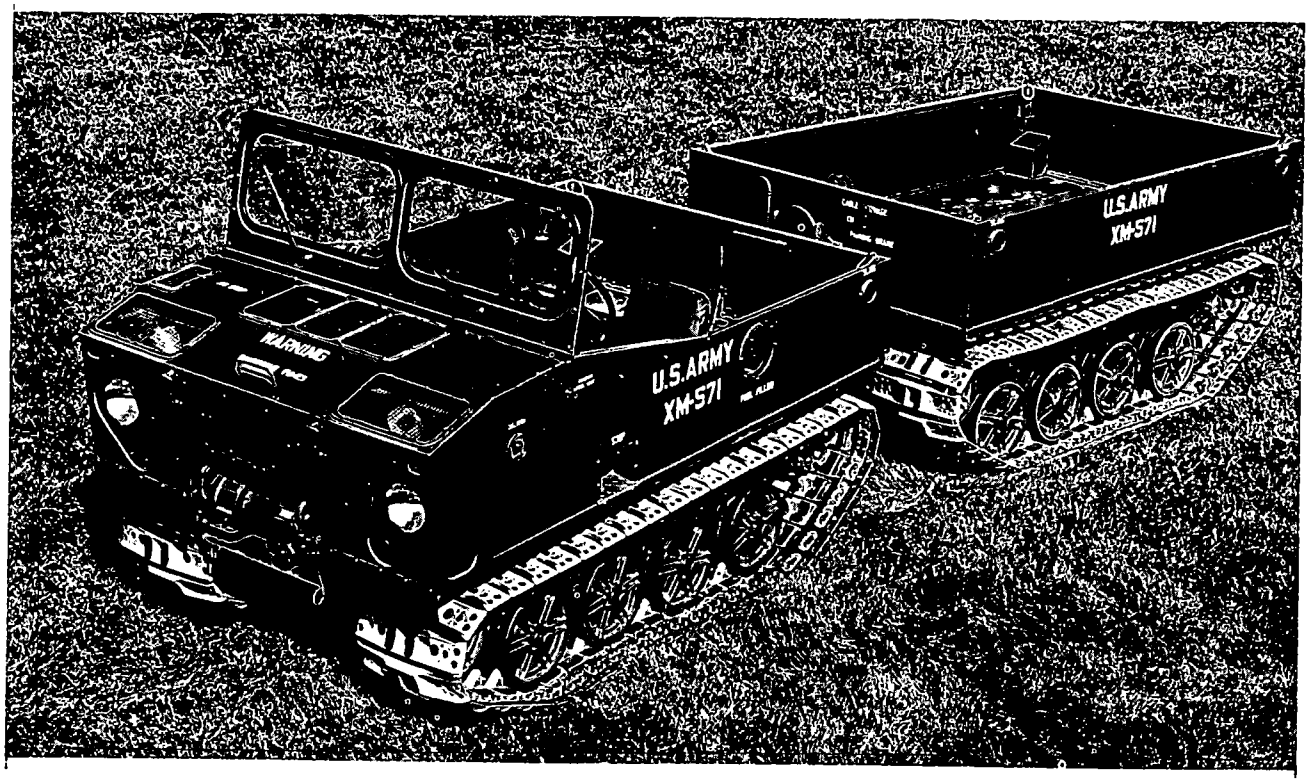


Figure B–52. Carrier, utility, articulated (M571).

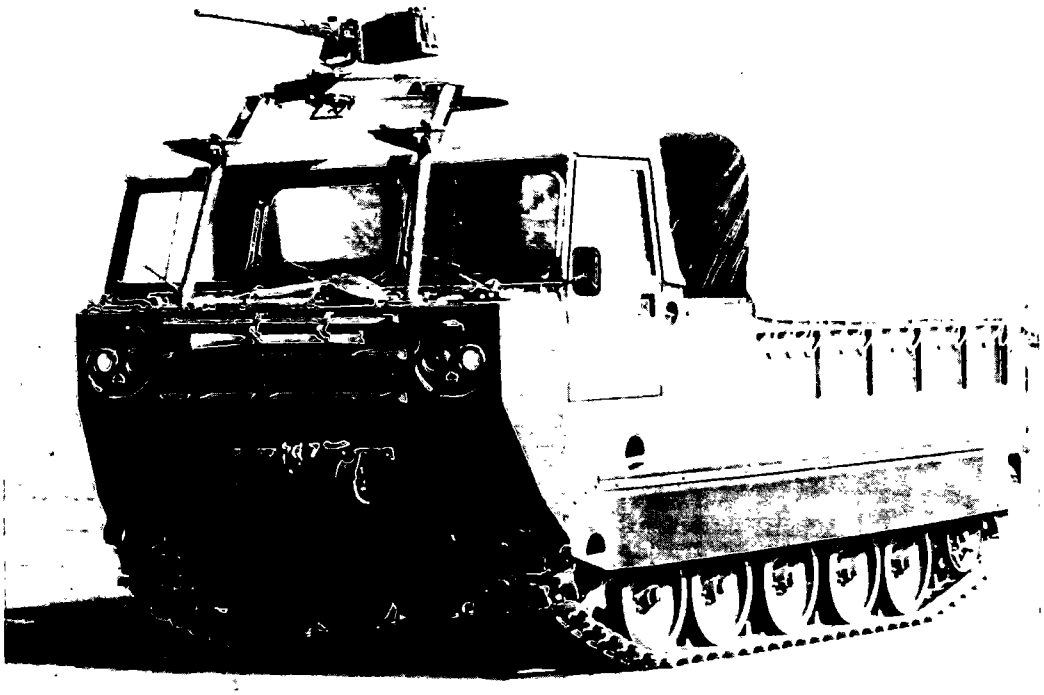


Figure B–53. Carrier, cargo, 6-ton, tracked (M548).

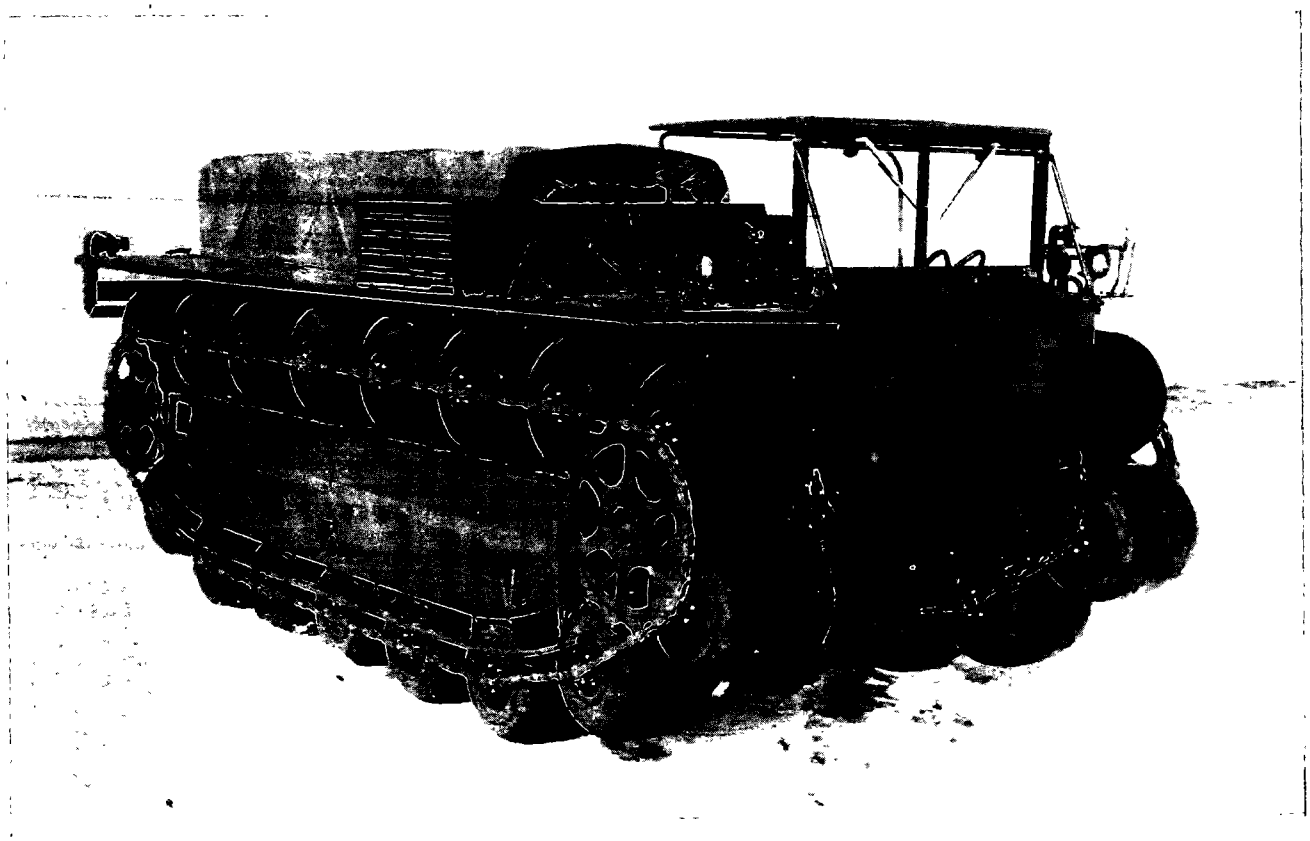


Figure B–54. Marginal terrain vehicle (MTV) XM759.

cargo carrier is a lightweight, unarmored, full-tracked, amphibious vehicle for logistic support. The suspension and power train components are common to those of the M113 family of vehicles. The M548 is capable of operations across lakes and streams, extended cross-country travel over rough terrain, and high speed over improved roads. Like the M113, the M548 has limited mobility in marshy terrain and a limited capability to negotiate riverbanks and canal banks without aid. The vehicle can carry a 6-ton payload, and the cab seats four men. The cargo deck of the M548 can be bolted in either a high- or low-level position. When in the high level, it makes a flat bed. In low level, it provides leg room for sitting passengers. The cargo compartment may be enclosed by bows and a cover. Kits are available to adapt the basic M548 cargo carrier to other uses such as ammunition carrier or prime mover. The M696 recovery vehicle is an adaptation of the M548, which uses the standard 5-ton M548 crane and its on-vehicle equipment.

(2) *Specific data.*

Length:	232 inches
Width:	105¾ inches
Height:	
Overall:	105½ inches
Reducible:	76 inches
Weight:	15,150 pounds net
Capacity:	
Crew:	1
Troops:	13 plus driver
Cargo weight:	12,000 pounds
Cargo size:	130⅝ by 96½ inches
Speed:	
Improved roads:	38 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	3.5 miles per hour
Range:	300 miles on land
Gradability:	
Forward slope:	60 percent
Side slope:	30 percent
Ground clearance:	16 inches
Vertical obstacle:	24 inches
Trench crossing:	66 inches
Turning radius:	14 feet
Ground pressure:	
With payload:	8.5 psi
Net weight:	4.6 psi
Fording depth:	Floats
Armor protection:	None
Armament:	None; ring mount for .50-caliber machine-gun may be mounted over cab

p. Marginal Terrain Vehicle (MTV), XM759.

(1) *General characteristics.* The XM759 marginal terrain vehicle (MTV) is a ½-ton, soft-tire tracked, cargo and personnel carrier designed to operate on dry land, in swamps, rice paddies, muskeg, and other adverse terrain normally impassable to wheeled and heavy tracked vehicles. It can transport 14 men or three standard pallets of cargo with a total weight of 3,000 pounds. The MTV's wheel-and-track suspension system uses a series of free-rolling, low-pressure pneumatic tires connected at the tire axles by an endless chain. A sprocket and idler arrangement drives the chains and lays the tires down in front of the vehicle, which then rolls over them. The MTV has excellent mobility in a delta-type riverine area.

(2) *Specific data.*

Length:	245 inches
Width:	110 inches
Height:	
Overall:	102⅛ inches
Reducible:	88 inches
Weight:	9,000 pounds net
Capacity:	
Crew:	2
Troops:	14
Cargo weight:	3,000 pounds
Cargo size:	52 inches by 148 inches (3 pallets)
Speed:	
Roads:	35 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	7 miles per hour
Range:	180 miles
Gradability:	
Forward slope:	60 percent
Side slope:	45 percent
Ground clearance:	30 inches
Vertical obstacle:	36 inches
Trench crossing:	72 inches
Ground pressure:	1.5 psi
Fording depth:	Floats
Freeboard:	36 inches
Armor protection:	None
Armament:	None

q. Lighter, Amphibious, 5-Ton (LARC–V).

(1) *General characteristics.* The LARC–V is a lightweight, aluminum hull, four-wheel, single screw, amphibious vehicle for transporting cargo and personnel in over-the-shore operations from ship to inland transfer points and for operations on inland waterways. Cargo capacity is 5 short tons. Side panels can be removed enabling a forklift to load or unload

palletized cargo. One 8-cylinder, 300-horsepower diesel engine provides power. The LARC–V has good surfing capability and can maneuver through a surf of 3.6 meters and plunging breakers. It can ford rivers, lakes, and canals and is marginally suitable for use in swampy or heavily irrigated terrain. It can transport supplies between LST's and prepared landing sites along riverbanks.

(2) *Specific data.*

Length:	34 feet 10 inches
Width:	10 feet
Height:	10 feet 2 inches
Weight:	21,000 pounds net with fuel
Capacity:	
Crew:	2
Troops:	25
Cargo weight:	10,000 pounds
Cargo space:	16 feet by 9 feet 8 inches
Speed:	
Land:	30 miles per hour
Water:	9 miles per hour
Range:	
Land:	250 miles
Water:	104 miles
Gradability:	
Forward slope:	60 percent
Side slope:	30 percent
Ground clearance:	
Hull to ground:	2 feet
Propeller shroud to ground:	1 foot 4 inches
Turning radius on land:	36 feet 6 inches
Vertical obstacle:	18 inches
Draft:	
Light, forward:	3 feet 3 inches
Light, aft:	3 feet 9 inches
Loaded, forward:	4 feet 1 inch
Loaded, aft:	4 feet 3 inches
Armor protection:	None
Armament:	None

r. Lighter, Amphibious, 15-Ton (LARC–XV).

(1) *General characteristics.* The LARC–XV is a medium-weight, aluminum-hull, four-wheel, twin screw, amphibious vehicle for transporting cargo and personnel in over-the-shore operations from ship to inland transfer points and for operations on inland waterways. Cargo capacity is 15 short tons. Two 8-cylinder, 300-horsepower, diesel engines provide power. The LARC–XV has demonstrated good water handling characteristics and good mobility on firm and semifirm soils. It is suitable for transporting supplies between LST's and prepared landing sites along riverbanks. The cab is forwarded while on land and aft when waterborne. Dual controls allow the operator to face either direction.

(2) *Specific data.*

Length:	44 feet 6 inches
Width:	14 feet 7 inches
Height:	13 feet 8 inches
Weight:	46,800 pounds net with fuel
Capacity:	
Crew:	3
Troops:	56
Cargo weight:	30,000 pounds
Cargo space:	24 feet by 10 feet (3 CONEXES or 12 pallets)

Figure B–55. Lighter, amphibious, resupply, cargo, 5-ton (LARC–V).

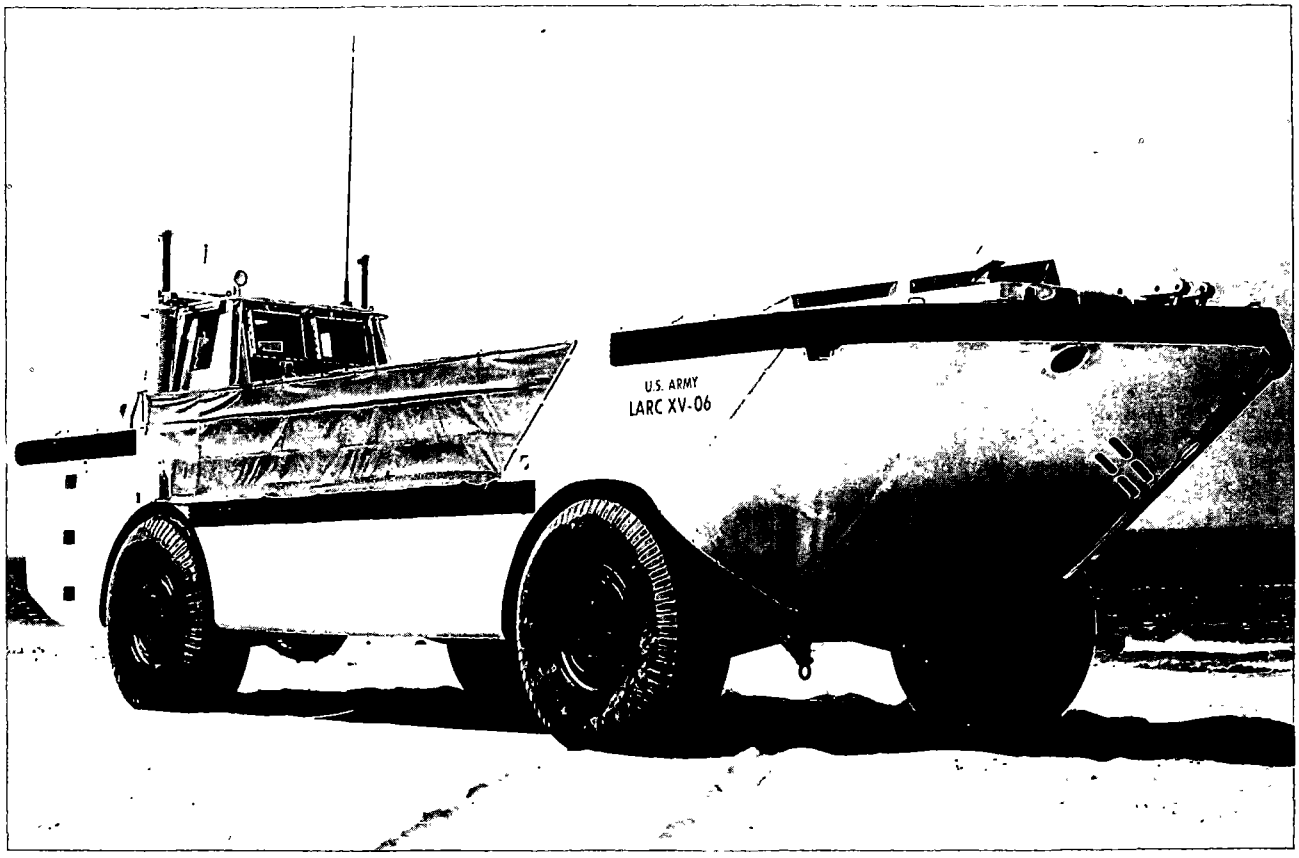


Figure B–56. Lighter, amphibious, resupply, cargo, 15-ton (LARC–XV).

Ramp opening width:	9 feet
Speed:	
Improved roads:	30 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	9.5 miles per hour
Range:	
Land:	403 miles
Water:	106 miles
Gradability:	
Forward slope:	50 percent
Side slope:	30 percent
Ground clearance:	
Hull to ground:	2 feet 5½ inches
Propeller shroud to ground:	1 foot 4½ inches
Turning radius on land:	49 feet 10¾ inches
Vertical obstacle:	24 inches
Draft:	
Light, forward:	1 foot 5½ inches
Light, aft:	2 feet 2½ inches
Loaded, forward:	2 feet 9⅛ inches
Loaded, aft:	2 feet 10½ inches
Armor protection:	None
Armament:	None

s. Lighter, Amphibious, 60-Ton (LARC–LX).

(1) *General characteristics.* The LARC–LX is a large, steel-hull, four-wheel, twin-screw, amphibious vehicle for transporting heavy vehicles, cargo, and personnel in over-the-shore operation from ship to inland transfer points and for operations on major inland waterways. Cargo capacity is 60 short tons; 100 tons in an emergency. Four 6-cylinder, 165-horsepower, diesel engines provide power. The draft of 2.4 meters requires a firm beach extending into the water for a considerable distance. Its maneuverability is limited by a turning radius of 23 meters. Because of its size, the LARC–LX is limited to transporting cargo and personnel from ships to prepared landing sites and readily accessible inland transfer points.

(2) *Specific data.*

Length:	62 feet 6 inches
Width:	26 feet 7 inches
Height:	19 feet 5 inches

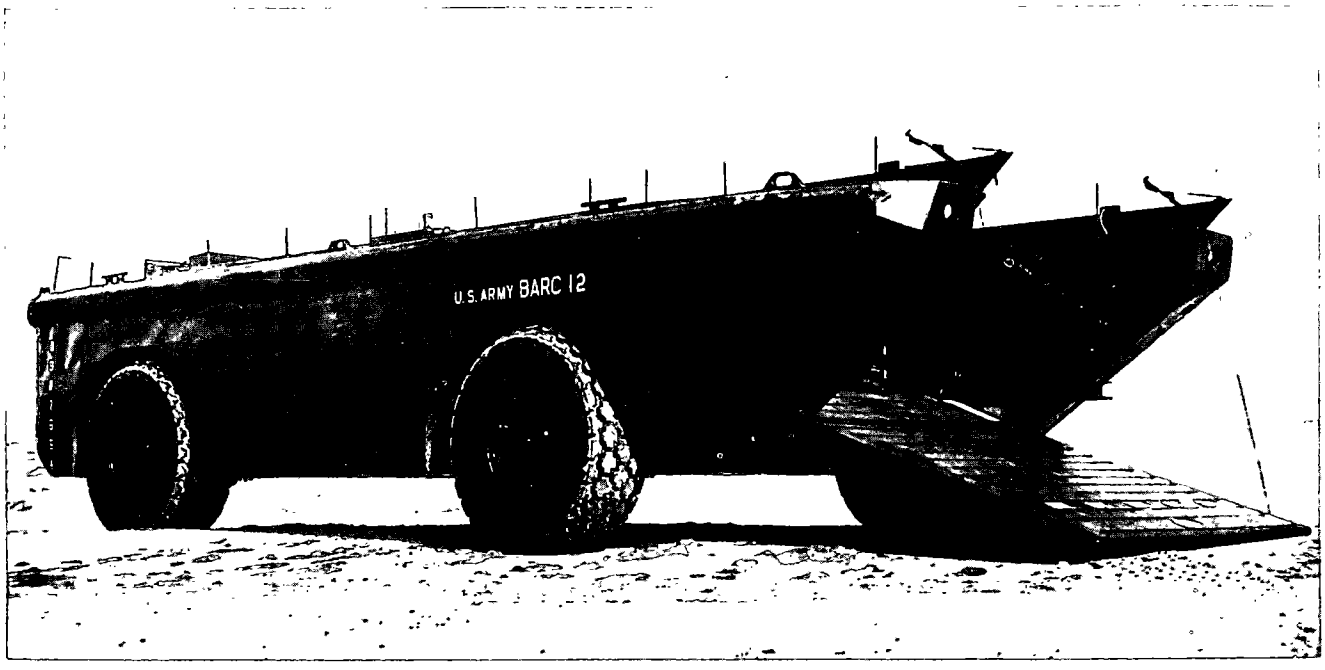


Figure B–57. Lighter, amphibious, resupply, cargo, 60-ton (LARC–LX).

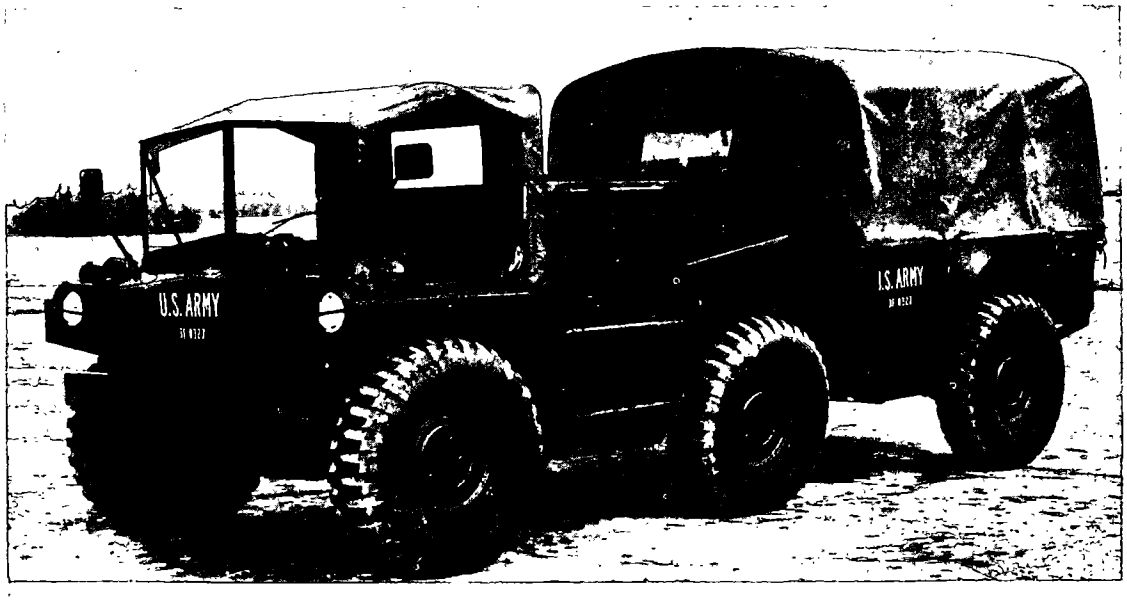


Figure B–58. Truck, cargo, amphibious, 1¼-ton, 6x6, M561.

Weight:	199,000 pounds net with fuel
Capacity:	
Crew:	8
Troops:	125; 200 in an emergency
Cargo weight:	60 short tons; 100 short tons in an emergency
Cargo space:	38 feet 3 inches by 13 feet 8 inches (3 vehicles)
Ramp opening width:	14 feet 6 inches
Speed:	
Improved roads:	14 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	7 miles per hour
Range:	
Land:	150 miles
Water:	75 miles
Gradability:	
Forward slope:	40 percent
Side slope:	40 percent
Ground clearance:	
Unloaded:	3 feet
Loaded:	2 feet ½ inch
Turning radius on land:	75 feet
Vertical obstacle:	30 inches
Draft:	
Light, forward:	6 feet
Light, aft:	7 feet 2 inches
Loaded, forward:	7 feet 11 inches
Loaded, aft:	8 feet 8 inches
Armor protection:	None
Armament:	None

t. Truck, Cargo, Amphibious, 1¼-Ton, 6x6 M561.

(1) *General characteristics.* The M561 is a dual-body, wheeled, 6x6 vehicle. Its oversize, low-pressure tires provide an average ground pressure of 4.8 to 6.0 psi. The vehicle floats, can navigate streams and slow-moving rivers, and can negotiate moderately firm structured banks.

(2) *Specific data.*

Length:	18 feet 5 inches
Width:	7 feet
Height:	5 feet 2 inches
Weight:	6,270 pounds
Capacity:	
Weight:	2,500 pounds
Cargo:	255 cubic feet (54 square feet)
Personnel:	10 including operator
Speed:	
Improved roads:	55 miles per hour
Cross-country:	8 to 12 miles per hour
Water:	1½ to 2 miles per hour
Gradability:	60 percent
Side slope:	30 percent
Ground clearance:	15 inches
Range:	520 miles highway cruise; 350 miles (estimated) cross country
Vertical obstacle:	15 inches
Armor protection:	None
Armament:	None

Figure B–59. Truck, cargo, 5-ton, 8x8 (M656).

u. Truck, Cargo, 5-Ton, 8x8 (M656).

(1) *General characteristics.* The M656 is capable of cross-country operations on semifirm terrain. It floats and navigates lakes, streams, slow-moving rivers, and firm-structured riverbanks. The average ground pressure of 11 or 12 psi may prevent operations over heavily irrigated and swampy terrain.

(2) *Specific data.*

Length:	23 feet
Width:	8 feet
Height:	8 feet 10½ inches
Weight:	15,600 pounds
Capacity:	
Weight:	10,400 pounds
Cargo:	110 square feet
Personnel:	18 including crew

v. Portable Artillery Firing Platform.

(1) *General characteristics.* The portable artillery firing platform, designed for the M102, 105-mm howitzer, permits establishing fire bases in rice paddies and soft muddy areas from which accurate artillery fires would otherwise be nearly impossible. The platform consists of a 22-foot square aluminum structure with a plywood deck and adjustable legs at the corners. At the tips of these legs, in contact with the mud, are 4-foot square, perforated metal bases that sink into the mud and reach the hardpan for stability. The platform is air-transportable by CH-47 helicopter as an external load.

(2) *Specific data.*

Size	22-foot square
Weight:	7,300 pounds

Figure B–60. Portable artillery firing platform.

APPENDIX C

BOAT PROCEDURES

Section I. ASSAULT BOATS

C–1. General

In a riverine area, units equipped with plastic assault boats perform missions similar to those assigned to dismounted units in other areas. Assault boats increase mobility and permit units to operate at greater speeds; cover greater distances; and carry more equipment, weapons, and ammunition. Personnel conducting reconnaissance and security tasks, maintaining contact between friendly units, and clearing blocked waterways can use assault boats effectively. Units, using assault boats for transportation, secure and hold critical terrain features or relieve or reinforce isolated units. Assault boats may transport part of a larger force that uses other means of transportation for combat operations. Units normally use assault boats on relatively secure routes and not for assaults on known enemy positions.

C–2. Planning

a. Careful planning is necessary before using assault boats on inland waterways. Some streams and canals are navigable for only short distances. Prior training of boat operators is essential. Adequate reconnaissance is necessary before movement. Although the course of a river or stream often provides the easiest and safest route of advance, it also channels movement and may lead to an ambush. Careless or hasty selection of routes can result in delays or loss of equipment and men.

b. When the use of assault boats is contemplated, planners consider both the preparation phase and the actual water movement. Certain aspects peculiar to the use of boats require special attention.

(1) Powered watercraft require sufficient power for the boat to negotiate the waterway when traveling against known currents.

(2) Units inspect all boats and equipment before departure to insure that all equipment is in operating condition and that paddles and life preservers are aboard. Personnel insure that adequate fuel and lubricants are available in each boat.

(3) Sufficient repair parts for emergency repairs must be available in case of breakdown.

(4) Signals for use between boats require rehearsal. Personnel insure that radio equipment is operating properly and on the correct frequency.

(5) In case a boat is swamped or ambushed, all personnel must be aware of the rendezvous points along the route.

c. Certain missions require that an automatic weapon be mounted on the boat. The ground mount for this weapon must be available in the boat in case the weapon has to be used ashore. At least one compass and one watch and, if possible, a radio and binoculars are necessary for each boat.

C–3. Equipment

a. Boat Selection. Several factors influence the performance of a boat: hull form, hull material, weight, type of motor and propeller, location of the motor, and distribution of weight. In general, the intended use is the determining factor in choosing a specific type of boat. The width, depth, and velocity of the current are considerations in selecting a boat for military use. Rubber boats are chosen when secrecy and stealth are the prime determining factors. Paddles or poles, wrapped with cloth,

produce less noise than unwrapped poles. Use of native boats may be advantageous, in some cases, because they are built to operate in the area and are less conspicuous than military craft. Locally made rafts may also be available for use.

b. Stowage.

(1) Personnel stow items of boat equipment according to approved load plans for rapid inventory and accessibility, even in darkness.

Typical items in each assault boat are—

Anchor and 30 feet of line	1
Mooring lines, 10 feet with eye on each end	2
Bailing can	1
Repair parts for outboard motor shearpins, propeller cone, propeller, spark plugs)	1 set
Collapsible plastic water container	1
Gas cans	2
WP and smoke grenades	4
Emergency rations	5
First aid kit	1
Seizing line (30 foot)	1
Hooded flashlight with colored lens inserts	1
Camouflage net	1
Paddles	6
Poles (12 foot)	2

(2) By attaching individual weapons and equipment to themselves with a line, personnel can retrieve these items if the boat is swamped or overturned.

(3) Personnel securely stow other supplies, equipment, and crew-served weapons to prevent their loss or injury to personnel if the boat capsizes. Crew-served weapons have a marker float and line attached to assist in retrieval. Each boat in the formation carries a variety of supplies and equipment so that the loss of one boat does not result in the abortion of the mission.

C–4. Care of Boats and Motors

The key to dependable service from outboard motors and assault boats is meticulous organizational maintenance and proper operation. A boat or motor used properly in normal operations more likely withstands the abuse it gets under combat conditions. Recommended precautions in the use of boats and motors are—

a. Proper Operation.

(1) Operate at moderate speeds to slow normal wear and deterioration of both boat and motor.

(2) Avoid hitting floating objects and sandbars.

(3) Do not allow the motor to run for long periods at idle or very low speed. Carbon builds up rapidly in slow-running, 2-cycle engines.

(4) Slow the engine before shifting. A fast, improper shift can cause engine breakdown in a critical situation.

(5) Allow the motor to warm up before operating at high speed. Accelerate and decelerate smoothly to avoid straining the engine.

(6) For 2-cycle engines, mix gasoline and oil thoroughly and in proper proportion. Failure to use enough oil or to mix well can cause the motor to burn out. Too much oil results in heavy carbon deposits.

(7) Handle the fuel line with care to prevent damage where it joins the connectors.

b. Preventive Maintenance.

(1) Keep the boat and motor clean and lubricated according to the technical manual (TM) for the item. Particular emphasis is necessary on boat fittings, underwater body, and motor lower unit.

(2) When operating in brackish or salt water, take the boat out of the water after use. Clean the bottom regularly and flush the motor with clean, fresh water.

(3) Include a set of spare spark plugs with each motor. Operators remove, inspect, and clean or replace them according to the TM for the particular motor.

(4) If the boat strikes an object in the water, the hull and motor lower unit require inspection both for cracks and for damage to the propeller, propeller cap, cotter key, and shearpin. Operators replace damaged or worn parts when discovered because minor defects can unbalance the motor and cause failure at high revolutions per minute.

(5) Carry spare shearpins. Use only the correct-issue shearpins. When issue pins are not available, an improvised pin of equally soft or softer material than the authorized one is permissible.

C–5. Navigation

a. Boat operators and other key personnel train in the basic principles of river navigation before their unit begins operation on

waterways. Boat operations may appear simple, but certain techniques require mastering. Training also includes use of native watercraft.

b. Stretches of waterways are known as curve and reach: the curve is a turn in the waterway course; the reach is a straight portion of the waterway.

c. The boat operator can read a waterway more easily when going upstream than when going downstream. Waterway channels and river obstacles indicate their locations by natural signs. By learning these signs and watching for them, the boat operator can navigate the rivers and streams safely and comfortably and without damage to his boat or motor. The boat operator requires thorough training before operating the boat alone.

d. The greatest current velocities and the

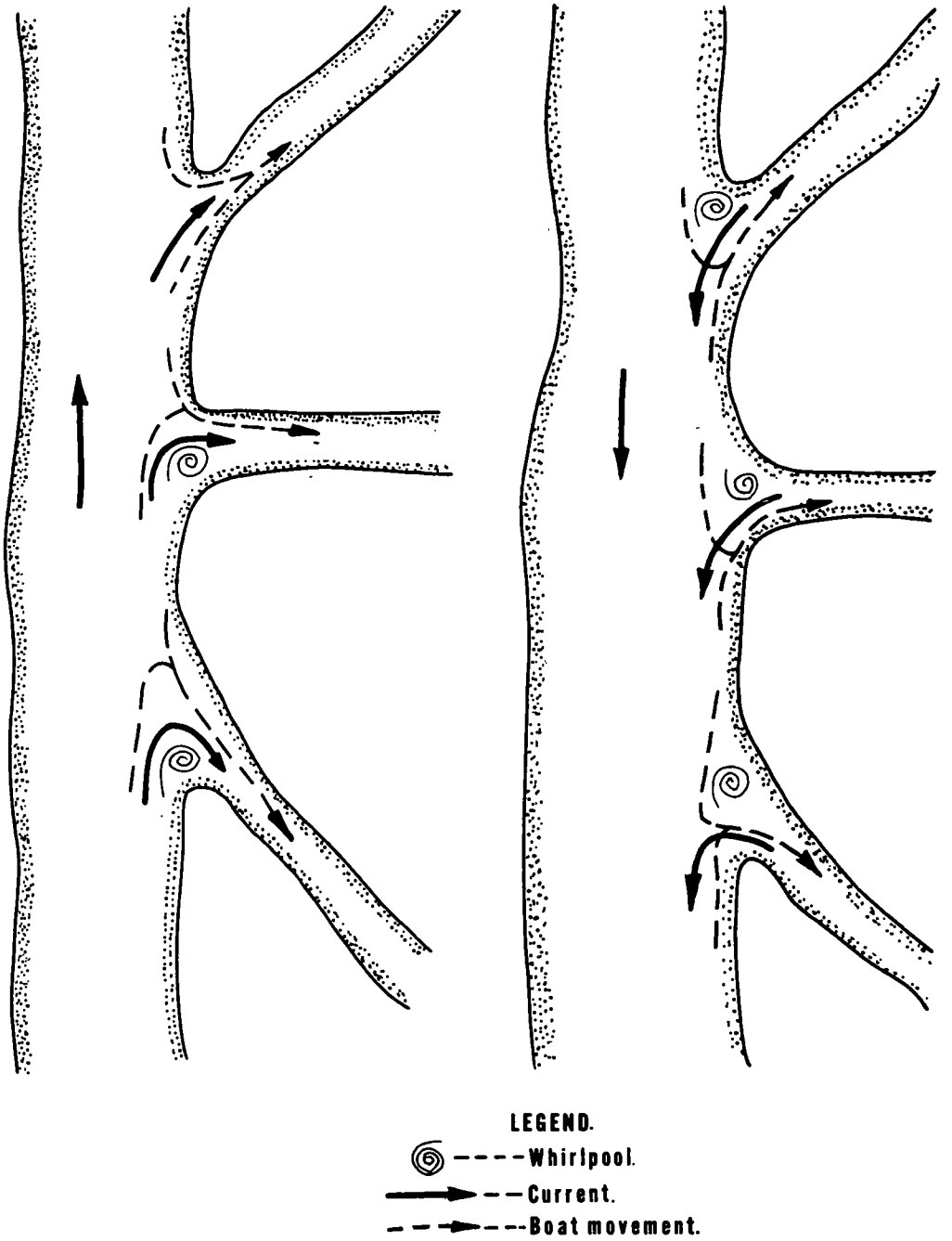


Figure C–1. Moving from one channel to another.

steepest gradients are generally found near the source of a river. Velocities may vary at any point of the river within short stretches or between points across a channel. Flow is swiftest where the channel constricts and slowest where the stream spreads out broad and shallow. In a meandering stream, centrifugal force throws the water to the outside of curves so that the deepest water is normally near the outside bends. Sandbars and shallow water are normally on the inside of curves. In spite of this general rule, underwater obstructions remain a problem. These obstructions can be present even in the deepest channels, particularly in tidal waterways.

e. The surface of the water directly to the front is a key to successful navigation. Lightly rippled water, where no wind is blowing, usually indicates shallow water. A long undulating wave indicates deep water and fast current. A smooth surface usually indicates deep water and slightly lessened velocity. A vee in the surface of the water generally indicates an obstruction lying parallel with the direction of current. Current velocity and the size of the obstruction together determine the size of the vee. The vee is only an indication of the size of that portion of the obstruction lying very near the water surface; it does not indicate the total size of the obstruction. A rolled surface, at a particular point, usually indicates an obstruction, such as a log or tree lying perpendicular to the direction of current.

f. In tidal waterways, silt deltas or shoals are often found on both ends of midchannel islands and on both sides of the mouths of entering waterways. The tidal flow backing up into tributaries usually forms a shoal across the mouth. Breaks in the shoal are near the shore rather than in midstream.

g. The coxswain (boat operator) positions himself where he can see the river course and the water surface. Occupants of the boat remain seated so they do not obstruct the operator's view or suddenly shift the balance of the boat. The coxswain avoids ripples, boils, and other indications of disturbed water because they can force his boat into obstructions that can tear out its bottom. He also avoids sweepers, trees that have been pulled into the river or stream by collapsing banks, or trees rooted to the bottom. A collision may cause a boat to overturn or be torn apart. A boat that overturns in sweepers exposes occupants to double danger. The tree branches can puncture pneumatic life vests or catch and hold men under water.

h. When moving from one channel to another channel that is perpendicular to the first, the boat operator navigates at right angles with the current into which he is traveling. He passes on the downstream side of the perpendicular channel, proceeds upstream a short distance, and then turns back into the flow of the new current. A power boat never goes into fast water at full throttle. The operator reduces speed to about half until he knows what lies ahead (fig. C–1).

i. Reconnaissance determines that the river or canal is of sufficient width and depth to accommodate the boat or watercraft used. If a unit is moving only a short distance or to a well-defined debarkation point, a hasty route selection may be the only preparation necessary. The length of the move increases the chance of a navigational error. For a short move, a simple plan committed to memory usually suffices. For example, "We will move west until we reach the canal intersection about 1,500 meters from here."

j. The use of a navigator and an observer is the best method to locate an exact position on an inland waterway. Unit personnel train in the performance of these duties. The navigator requires a map, a compass, a flashlight, and a pencil. During darkness, he lies under a poncho on the floor of the boat. The poncho prevents anyone on or near the waterway from seeing a light that he may be using. The observer, well forward in the boat, calls the turns, bends, intersections, and other landmarks to the navigator. With the aid of his compass, the navigator associates this information with his present position on the river and records it for future use. The observer and the navigator work together to maintain a knowledge of their location at all times. By using this navigational method, the boat can move to any accessible predesignated landing sites. This is particularly important on patrol missions when boats provide transportation for infiltration into enemy areas.

k. Another aid to navigation is a strip map showing critical points drawn on a piece of

luminous tape. A time-distance method is also available. The time from the point of origin to the first checkpoint is noted and compared with the entire distance to travel. This provides an estimate at the time required to complete the movement. If time of arrival at destination is critical, reverse planning by the time-distance method provides the required starting time.

C–6. Organization

a. Each assault boat transports at least four persons including the coxswain, who is an experienced operator, trained in river navigation. He may or may not also be the boat commander. Other personnel perform duties to fulfill the requirements for navigation, observation, rowing, poling, etc. The size of the boat determines the size of the crew.

b. Normally, an element moving on water consists of at least two boats to provide some depth, flexibility, and safety if one boat comes under enemy fire, is swamped, or is swept into obstructions. The number of men, weapons, and boats necessary for the movement depends on the mission, but units of more than eight boats normally form into smaller maneuver elements. When assigning personnel to boats, the commander tries to maintain tactical unity.

C–7. Formations

The tactics of small waterborne units are similar to those of other small mounted and dismounted elements. Normal formations (column, parallel columns, vee, wedge, and echelon) are applicable to water movement. The situation and mission influence the choice of formation.

a. The column formation, or a variation, is frequently a choice because it allows all craft to use the same water and cover. Therefore, the risk of accidental grounding decreases. A disadvantage of the column formation is its provision of minimum firepower, surveillance, and security to the front.

b. The vee formation permits excellent firepower to the front and good firepower to each flank. It is useful during periods of reduced visibility when units maintain surveillance of both banks and maintain boat-to-boat visual contact.

c. The wedge or echelon formations are particularly suitable to maintain visual surveillance of one or both banks. These formations permit excellent firepower to the front and good firepower to one or both flanks.

C–8. Control and Coordination

A simple, rapid, and reliable means of boat-to-boat communication is necessary. Arm and hand signals are satisfactory, but waterborne elements require additional immediate-action procedures and backup communication means to insure smooth functioning. The commander assigns checkpoints along the route. Reconnaissance aircraft communicate directly with a waterborne element either by using radio, when available, or by dropping messages. Use of a simple, rapid means of identification is necessary to coordinate the waterborne movement with other friendly forces in the area.

C–9. Reaction to Enemy Fire

a. The reaction of troops moving in assault boats to fires from an enemy outpost or ambush depends on the mission. When the mission requires avoiding contact, continued movement by waterway may be extremely difficult. The waterborne element may wait until darkness and then move under cover of the opposite bank. It may be necessary to dismount and continue the movement on foot.

b. When the commander has authority to fight, he has several possible courses of action.

(1) When time is critical, the element maintains forward movement and executes a coordinated plan for suppressive fire on the enemy position.

(2) An assault team may attack the ambush force or place a smokescreen between it and the boats. When possible, the ambush force and enemy positions are overrun.

c. A mission to seek out and eliminate enemy forces encountered requires a more deliberate attack on the enemy force. For example, when the leading boat comes under enemy fire, personnel in the two lead boats beach their craft and return the enemy's fire. The element leader goes ashore and, using all available cover and concealment, moves forward to reconnoiter the ambush site. He decides how best to use his force to destroy the enemy position quickly. By radio or arm and hand signal, he orders the element to beach all

boats and to move forward. At least one automatic weapon remains at the boat assembly area. Boat operators protect their boats with automatic or individual weapons. After capture or destruction of the enemy, the element continues the mission.

C–10. Movement

a. For administrative moves on extremely wide rivers, boats normally move along the center of the river beyond the range of effective small-arms fire. On narrower waterways, to take advantage of natural concealment, movement is as close to the shoreline as is consistent with the water mine threat. Boats maintain an interval of 45 to 90 meters to maintain dispersal and to prevent collisions. Boats always maintain their relative positions in the formation. The two lead boats operate as a team, moving from one observation point to another. Sharp bends in a river frequently obscure the view of the river ahead. Personnel from one of the two lead boats go ashore to reconnoiter the river beyond the curve. Automatic weapons from the other boat cover the personnel ashore. Footprints along the banks of the waterway may indicate the presence of enemy troops; waterfowl, suddenly alarmed and flying toward the unit, usually indicate the movement of humans along the river. Tributaries emptying into the waterway along the route are not entered unless required by the mission. Many of these tributaries may not be navigable, and entering them may result in damage to the boats or may unnecessarily delay the movement. When islands are encountered, the boats move through the near channel, avoiding open, exposed areas.

b. The element leader may order halts to send messages, rest, eat, or reconnoiter specific areas. The area selected for a halt should provide cover, concealment, and good firing positions and favor defense. The element maintains all-round security and continues to improve the position until it departs.

c. Secrecy of movement is difficult when using a motor and traveling against the current. At night, motor noise can be heard up to 8 kilometers away. (The noise from some newer types of motors travels less than 500 meters.) Movement with the current, without using the motor, reduces noise.

d. Movement may be continuous, by successive bounds, or by alternate bounds. FM 17–36 provides an explanation of methods of movement.

C–11. Night Operations

Movement after dark assists in avoiding detection by the enemy. Special considerations for moving on waterways at night are as follows:

a. Waterways are more difficult to read, and dangerous areas are more difficult to detect.

b. All noises are audible at greater distances.

c. Coordination with friendly units is mandatory.

d. Lights and light-producing weapons such as white phosphorous (WP) grenades and flares are effective, both offensively and defensively.

e. Concealment along waterway banks is more effective.

f. Deception is more effective when units use native craft.

g. Detailed advance planning and rehearsals are necessary to insure prompt reaction by all personnel.

h. Standing operating procedure (SOP) stowage of equipment insures its location and use without lights.

i. Since enemy forces frequently employ reconnaissance by fire, friendly units withhold fire until obviously the enemy is firing at the boat.

Section II. ARMORED TROOP CARRIERS

C–12. General

a. Each unit forms boat teams when it undertakes a waterborne operation. A boat team consists of the Army troops embarked in one watercraft. An armored troop carrier (ATC) boat team may not correspond exactly to unit organization, but an infantry platoon is usually the basis of the team. Positioning boats in the formation achieves unit integrity or dispersion, as required.

b. The senior Army man in each craft is normally the boat team commander. He and

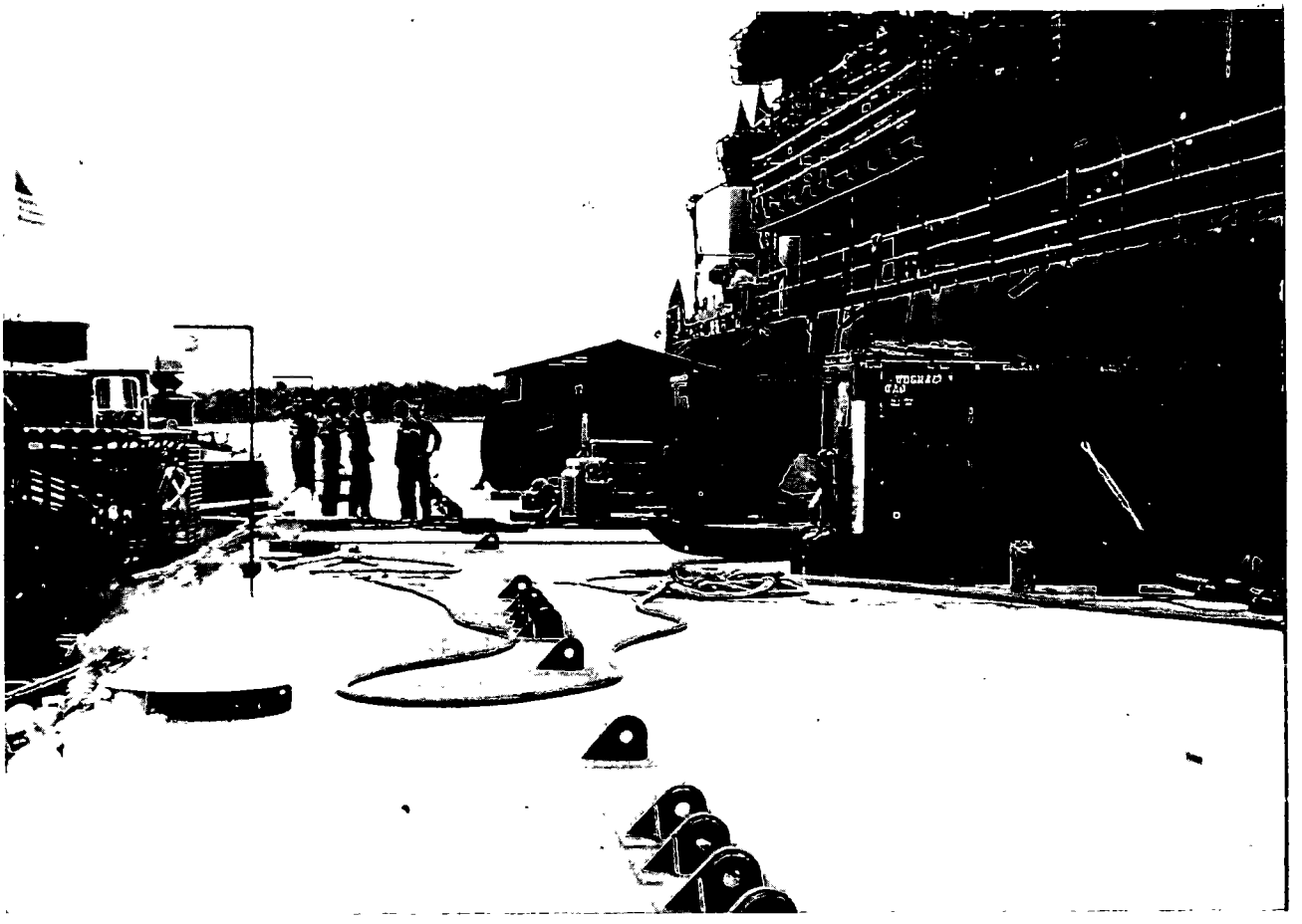


Figure C–2. AMMI barge moored alongside barracks ship.

his designated assistant supervise the loading of Army personnel and equipment. The boat team commander also controls and directs the actions of embarked personnel during the movement.

c. This section, primarily for guidance of boat team commanders and their assistants, contains information on types of procedures employed. The unit SOP may modify the procedures herein.

C–13. Preparation for Movement

a. Major threats to embarked troops during movement are shrapnel and mine. A mine detonated near a boat can incapacitate a large number of men if the boat team commander has failed to take proper precautions. Accidental firing of weapons is also a hazard.

(1) The boat team stows and secures supplies and equipment to prevent their becoming missile hazards.

(2) Unless a dry ramp landing is probable, crew-served weapons remain in manportable sections and are not assembled prior to landing. They are not loaded until necessary, and then only under careful supervision.

b. Individuals either wear or otherwise protect all individual equipment. They wear helmets and lifejackets at all times. They wear packs if shock-absorbent seats are available; if not, personnel sit on their packs. Individual weapons are clear; safety is on; and magazines are removed while onboard the ATC. All personnel sit or lie in a braced position to best absorb shock from below. Their movement about the ATC cargo well is minimal. When standing, their weight is evenly distributed on both legs, and their knees are flexed.

C–14. Loading

a. The boat team commander organizes his team to expedite loading and securing equip-

ment in the ATC. Procedures for loading through the bow ramp, from shore, pier, or AMMI barges are relatively simple (fig. C–2). They require commonsense, safety precautions, and a reasonably even distribution of weight in the cargo space. Troops and vehicles load, prepared for speedy unloading.

b. AMMI barges normally are moored alongside APB's and APL's. Loading from these barges follows the same general procedures as loading from a pier. To prevent congestion in companionways, on deck, or on the AMMI barge, members of boat teams remain in designated assembly areas until notified of their boat's arrival alongside. After notification, the team moves to the designated loading point on the AMMI barge and loads aboard its boat.

C–15. Boat Team Commander's Checklist

a. Preparation.

(1) Supervise boat team in assembly and loading areas.

(2) Appoint boat team members to required duties.

(*a*) Assistant boat team commanders.

(*b*) Two .50-caliber gunners.

(*c*) Four 7.62-mm machinegun gunners.

(*d*) Two grenadiers.

(*e*) Two bowline handlers/man-overboard lookouts.

(3) Assign personnel and equipment to positions in the boat in accordance with the ground tactical plan.

(4) Reconnoiter the route from assembly area to loading point.

(5) Muster boat teams in assembly area at required time.

b. Loading.

(1) Inspect each member for uniform, rations, and ammunition as well as adjustment of equipment.

(2) On order, lead boat team from assembly area to loading station.

(3) Report boat team readiness to loading station officer.

(4) Supervise loading of crew-served weapons and equipment.

(5) On order, commence and supervise loading.

(6) Inform coxswain (crew chief) of the ATC when all men and equipment are aboard.

(7) Insure that—

(*a*) Men are in assigned positions.

(*b*) Muzzles of weapons are all pointed outboard.

c. During Movement.

(1) Keep movement of troops in the cargo well to a minimum.

(2) Insure that all personnel wear helmets, lifejackets, and packs.

(3) Continually inspect for potential missile hazards.

(4) Check troops for proper body positions.

(5) Coordinate with coxswain to train selected troops in immediate action procedures.

(6) Keep troops awake and alert. During lengthy movements, personnel may sleep.

(7) Provide immediate action assistance as requested.

d. Assault Landing.

(1) Check individual equipment prior to debarkation.

(2) Supervise loading and locking of individual weapons.

(3) Supervise assembly of equipment going ashore.

(4) Supervise removal of lifejackets prior to landing.

(5) When ramp is fully down, lead the boat team out as fast as possible.

C–16. Immediate Action Procedures

a. Embarked troops may assist boat crews during the movement. Selected individuals receive training in performing boat crew duties. This provides trained personnel when the boat crew requires assistance.

b. Immediate action procedures that may require assistance from embarked troops are—

(1) *Responding to enemy fire.* Embarked troops may replace wounded boat crewmen or fire organic grenade launchers and automatic weapons from inside the cargo well. Firing from maneuvering boats in a large formation is extremely dangerous and requires strict fire discipline. Engine and weapon noise requires gunners' alertness to insure effective fire control. Gunners firing from the cargo well fire their weapons over the gunwale and normally need a fire controller. The controller insures that all personnel firing from the cargo well receive and understand fire orders.

(2) *Assisting in damage control.* When the ATC crew becomes involved in extensive firefighting or damage control, they request assistance from the embarked troops in manning weapons, moving cargo, shoring, or assigning men to work with boat crew personnel. Embarked personnel keep clear of access routes and working space around the damaged area. However, initiative helps to reduce damage. For example, if a large hole is opened below the waterline in the cargo well area, embarked troops may be able to stop the flow of water quickly by stuffing mattresses into the hole and using the pipe bunk frames for shoring. Designated personnel know the location and characteristics of firefighting equipment.

(3) *Securing a beached boat.* A boat may beach unexpectedly as a result of breakdown or combat damage. If possible, the boat is towed off immediately and/or the troops and crew are transferred. However, the embarked troops may assist in establishing local security until the boat is towed off or the troops and crew are transferred to another boat. Boat teams develop a plan for immediate execution.

(4) *Assisting in towing operations.* The boat crew, unassisted, normally accomplish towing operations. When under fire, however, the boat crew may man all boat crew stations and execute a tow with assistance of embarked troops. Expeditious towing requires rapid and proper line handling. Troops participating in waterborne operations require a familiarity with towing arrangements.

(5) *Abandoning boat.* Before troops abandon a boat, the boat is normally taken under tow or run aground. The troops may transfer to another craft, or they may have to go into the water under fire. When abandoning a boat under fire, embarked troops—

(*a*) Wear lifejacket and helmet. Take weapons if conditions permit.

(*b*) Move over gunwale, keeping as low as possible on the side away from heaviest fire.

(*c*) Begin watching for approaching boats. *Do not swim to shore.*

(*d*) Float on back and close to water surface to reduce effects of underwater explosions and chances of being hit by boat propellers.

(*e*) Consider removing lifejacket to present a smaller target.

(*f*) When burning oil is floating on the water, personnel must swim underwater and surface only to take a breath, and then only after splashing an area clear of oil.

(6) *Man overboard.* All persons require training to react to the call "man overboard." When a man is seen in the water, shout "Man overboard," adding "port side" (left) or "starboard" (right), as the case may be. Designated personnel observe through the two ports in the ramp; and if, possible, a man is high enough on the bow ramp to point toward the person in the water. When any boat reports a man overboard, all boats in the movement group receive the notification and are given the location of the boat from which he fell.

C–17. Assault Landings

a. Although an organized enemy may not oppose the landing, embarked troops always conduct an assault landing. The landing consists of two phases: preparation and movement ashore.

b. Troops remove lifejackets prior to landing and leave them in the boat. Just before landing, troops put on packs, load and lock weapons, and assemble equipment to be carried ashore.

c. When the ramp is fully down, troops depart the boat quickly. If a dry ramp landing is not possible, lines, beach matting, or planks assist in crossing mud.

APPENDIX D

CANAL-CROSSING TECHNIQUES FOR MECHANIZED VEHICLES

D–1. General

Combat experience under internal defense conditions is inundated areas has demonstrated the need for developing means for expediting canal crossings of mechanized and armored cavalry units. This need particularly applies in the Mekong River Delta of South Vietnam, where muddy-bottomed, steep-banked, swift-current canals have caused loss of operational momentum and, occasionally, complete termination of the operations.

D–2. Techniques of Canal Crossing

Several effective techniques of expediting canal crossings and vehicle recovery have been developed and reported in interim reports and test reports. This appendix provides information on these canal-crossing techniques. Each technique is applicable to both the M113 armored personnel carrier (APC) and the M-114 command and reconnaissance vehicle. Specific techniques, discussed in succeeding paragraphs, include the following:

a. Capstan-anchor.
b. Push bar.
c. Balk aluminum bridging.
d. Push method.
e. Employment of demolitions.
f. Brush fill.
g. Towing.
h. Block and tackle (waterborne).
i. Block and tackle (landborne).

Figure D–1. Troops prepare to sink the anchor.

Figure D–2. The anchor is sunk, using the vehicle on equipment materiel (OEM) crowbar.

j. Log bearings.
k. S-hook.
l. Swift-current crossings.

D–3. Capstan-Anchor Vehicle Recovery

a. The capstan-anchor method of self-recovery, depicted in figures D–1 through D–6, is one of the most successful techniques developed for existing steep-banked canals.

b. This expedient features steel adapters permanently bolted to the vehicle drive sprocket and aluminum capstans fastened to the adapter by means of a single T-lug.

c. It uses auger-type ground anchors and standard marine-type anchors as "dead men" (fig. D–1). Auger-type ground anchors consist of augers, either 6- or 8-inch diameter and auger eyes, permanently affixed to 6-foot long steel pipes. The 5/8-inch steel pipes for the 6-inch auger and the 1 7/8-inch for the 8-inch auger are satisfactory. Timbers, buried at ground level directly in front of the ground anchor eye, distribute the pull over a large area and provide a firm anchor. Failure to use the timber may bend the anchor shaft. Personnel fasten a 1-inch nylon rope to the capstans and pass the rope through the eyes of the imbedded anchors, take up all slack in the rope, and tie it to the anchor. Normal sprocket action allows the vehicle to recover itself. The direction of pull must remain at 90°. The rope climbs the rim of the capstan and becomes entangled in the sprocket and track if the vehicle turns sideways during the recovery.

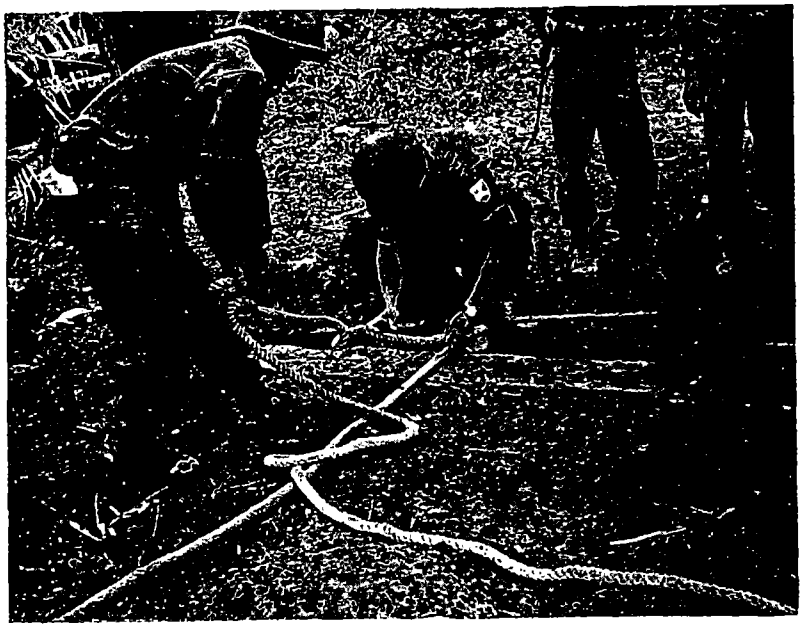


Figure D–3. Nylon rope is threaded through the eye of anchor.

Figure D–4. Nylon rope is threaded through the outer flange and wrapped on the capstan.

d. A well-trained crew, using this field expedient, can cross a waterway in from 15 to 20 minutes.

(1) *Operations after vehicle is immobile.*

(*a*) Remove sufficient mud from around the adapter to expose the mounting shroud, locating pins, and threaded center hole.

(*b*) Install the drum by alining the holes in the drum with the pins on the adapter and screwing the T-bolt firmly into the center hole. (A ½-inch-square drive socket wrench assists in tightening the T-bolt.)

(*c*) To secure the rope to the left side of the vehicle, extend about 12 inches of the rope through one of the holes on the outside flange, starting from the inboard side. Pass this end back through the adjacent clockwise hole. Now securely wind the main body of the rope over the loose end clockwise around the drum two or three complete turns.

(*d*) The procedure for securing the rope on the right side is similar to that for the left side. On both sides of the vehicle, extend the rope forward from the underside of the capstan drum.

(*e*) After securing the rope on both drums on the vehicle, select an immovable object, or dead man, as described in paragraph D–3*c*, as nearly in front of the vehicle as possible so that the ropes directly approach the drums. Remove all slack from the ropes and secure to the immovable object or dead man. Using one long rope with each end secured to a drum and the middle allowed to slip around or through the immovable object is better than using two separate ropes. However, two separate ropes are satisfactory, provided tension on each rope is approximately equal.

(*f*) Place the vehicle transmission in low range (1–2) and slowly proceed out of the mired area.

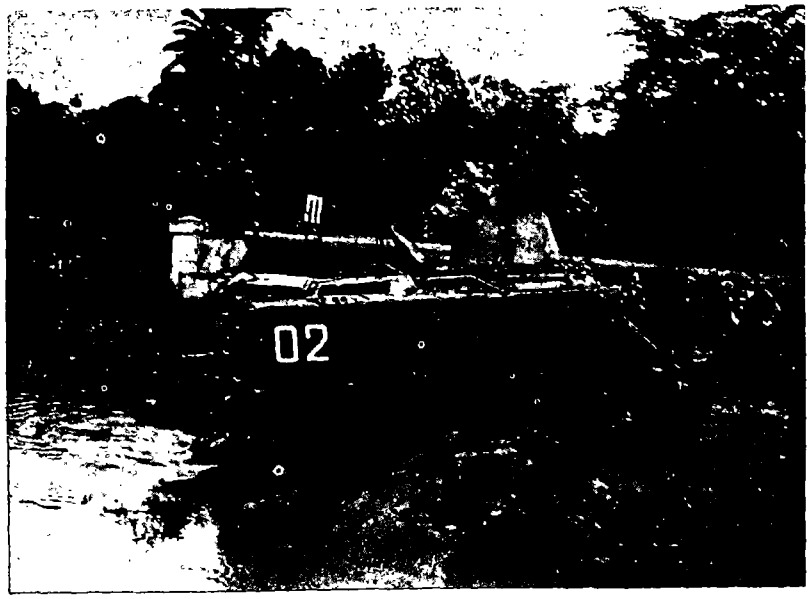


Figure D–5. The recovery is completed.

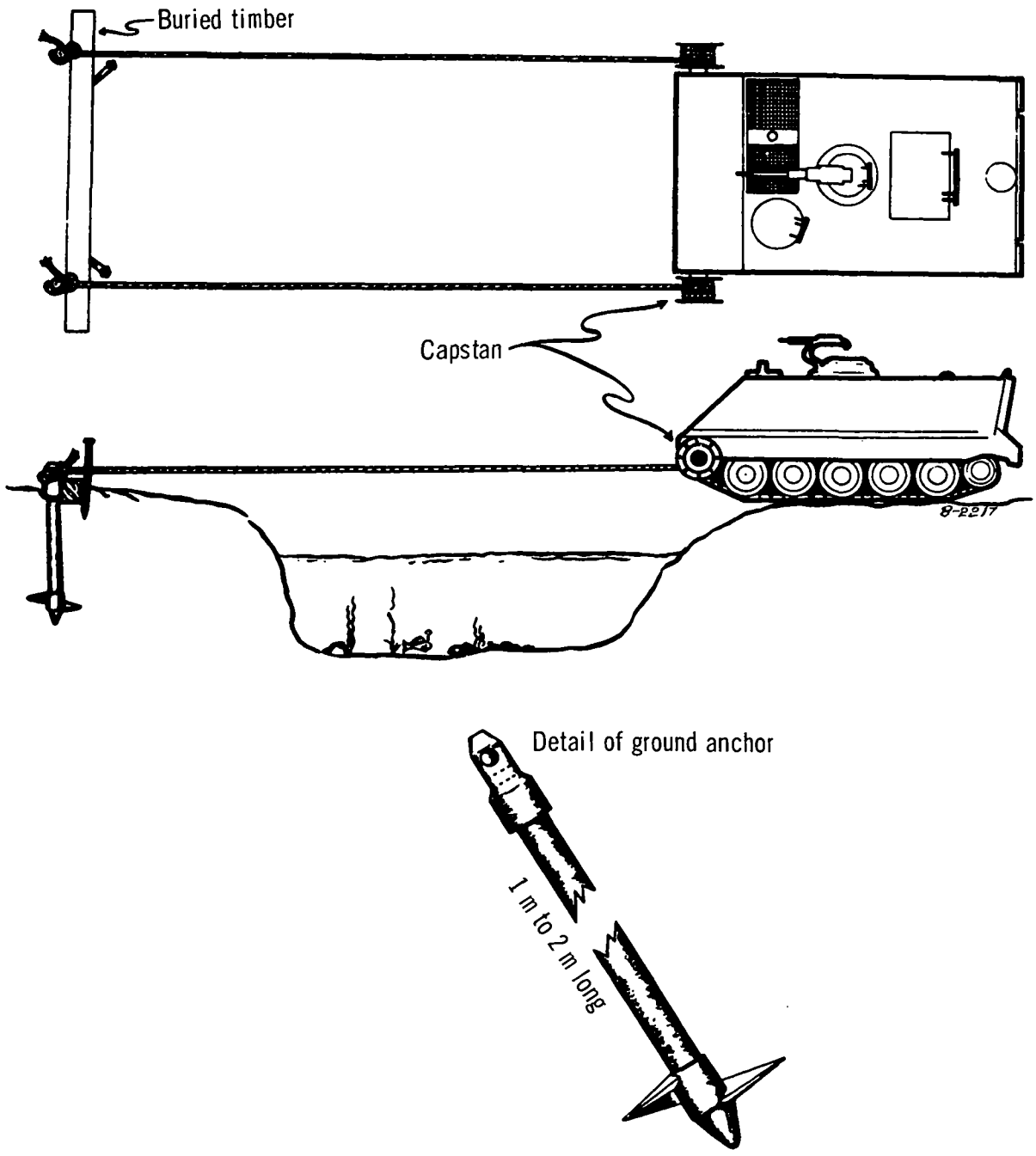


Figure D–6. Schematic drawing of the capstan-anchor recovery.

(2) *Capstan installation procedure for the M114.* Installation of capstans to fit the M114 is similar to that outlined in the subparagraphs above.

D–4. Push Bar

a. A locally fabricated push bar, developed to facilitate M113 crossing of the innumerable small canals found in the Mekong Delta region, is shown in figures D–7 through D–12.

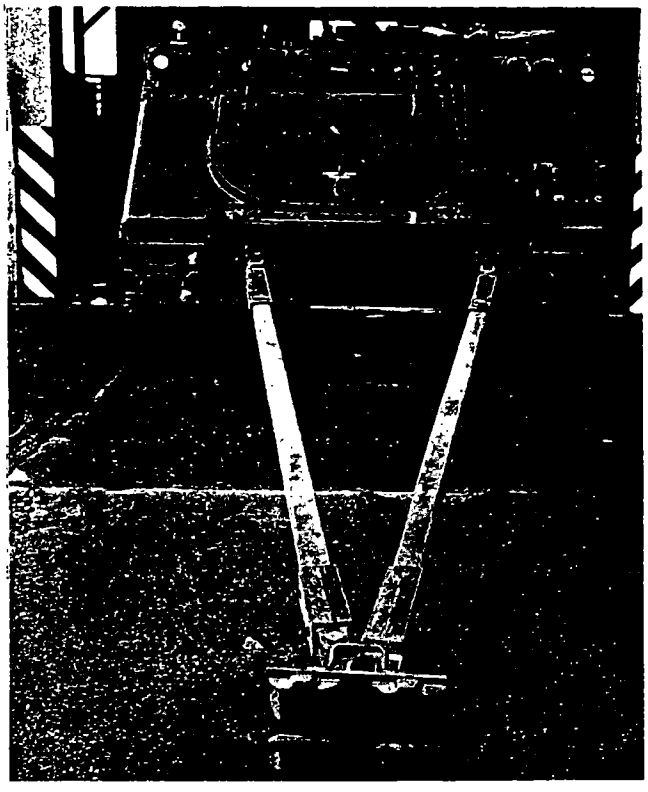


Figure D–7. Front view of M113 with push bar attached.

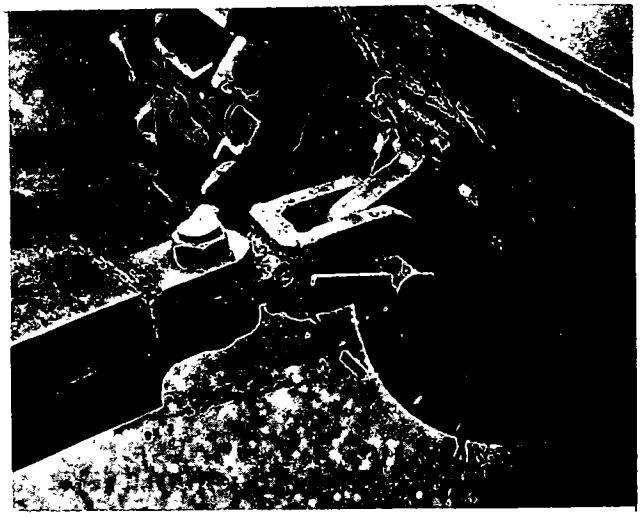


Figure D–9. Closeup of steel adapter mounted on vehicle tow eye.

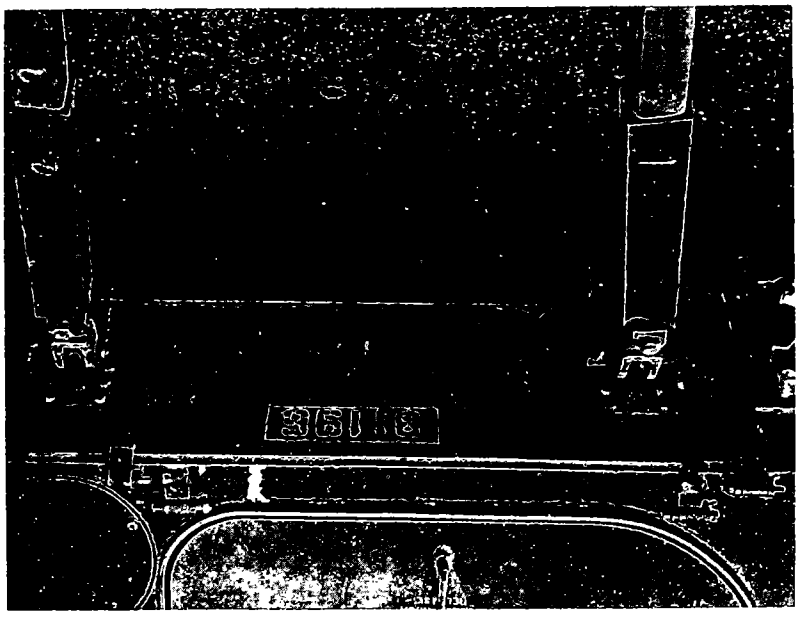


Figure D–8. Steel adapters mounted on ~~M113 tow eyes.~~

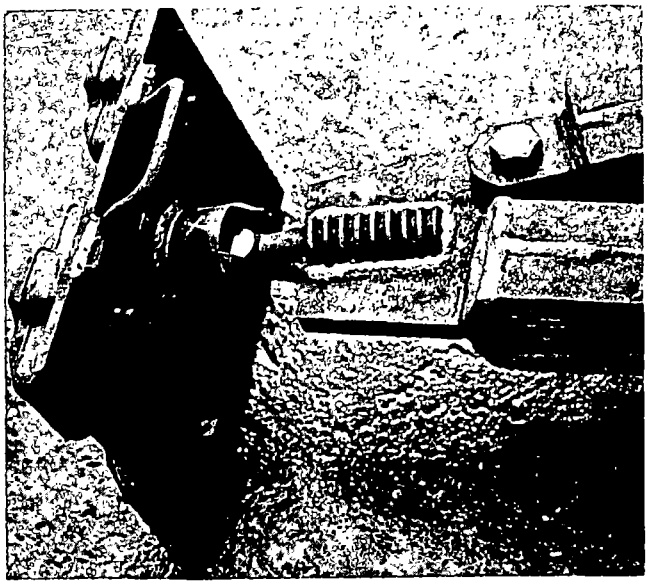


Figure D–10. A ball-and-socket joint affords universal action to the push foot.

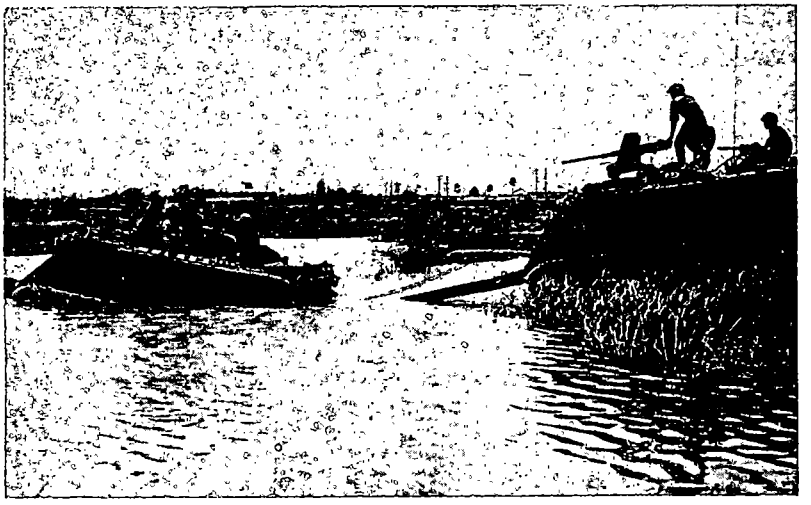


Figure D–11. The pushing operation starts. Both vehicles use 1–2 drive range.

b. The fabricated push bar replaces the log-pushing method that required dismounted troops to position the log between the pushed and the pushing vehicle.

c. This field expedient is in an early stage of development and requires development of a small hand-operated winch to raise or lower the "push foot."

d. The wooden 4- by 4-inch timbers shown in the figures are adequate for average crossings. These timbers require reinforcement at the center point to prevent buckling outward under heavy stress.

e. The push bar remains on top of the vehicle until required.

Figure D–12. The exit is completed.

D–5. Balk Aluminum Bridging

a. Balk aluminum bridge sections of 8- and 15-foot lengths are available through normal supply channels. The sections are buoyant and are suitable for spanning short gaps, either dry or wet or to corduroy a road or canal bank (figs. D–13 through D–15).

b. Units, using items available through normal supply channels, can fabricate a launcher attachment for the APC to carry and launch a 30-foot deck balk bridge.

Figure D–13. Section of bridging being placed over dry gap.

Figure D–14. Vehicle begins movement across canal.

D–6. Push Method

a. The push method (figs. D–16 and D–17) employs one or more carriers pushing a mired carrier. Normally, push bars are 4- by 4-inch timbers or short sections of balk aluminum bridging. Small logs may substitute for the timbers or balk aluminum bridging.

b. Units use the push method extensively in crossing paddies, bogs, and narrow canals. Daisy chain refers to the use of two or more vehicles to push the mired vehicle.

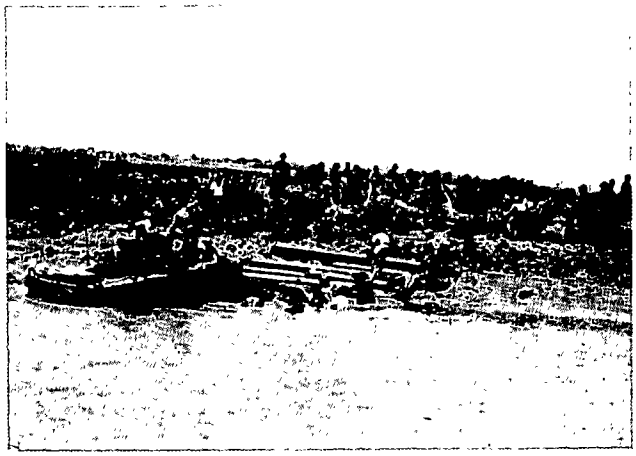


Figure D–15. Corduroy road assists exit on far bank of canal.

D–7. Employment of Demolitions

a. A frequent obstacle encountered is the exit bank of a canal or river that is too steep for the M113 and M114 to climb. Additionally, dikes that separate rice paddies sometimes become obstacles when they are impossible to climb or breach by impact. Many variations and degrees of conditions exist when crossing canals—the vehicle may be swimming, or it may have firm contact with the bottom; the crest of the bank may be above or below the top of the vehicle; the bank may be vertical or sloped.

b. The employment of demolitions to assist in exiting a canal is not a crossing means. Units use TNT or composition C4 as the explosive when reducing obstacles. Troops use shovels to dig holes or the steel shaft of the ground anchor to drill holes to emplace explosive. The exit site, prepared by demolition, may not be suitable for unassisted exit and will often require a push or pull expedient.

c. To simplify the calculations for obstacle reduction by demolitions, a single distance "X" in feet determines charge sizes and locations, expressed in terms of this "X" distance. Charges consist of 10 pounds of explosive per foot of depth of the charge. Figure D–18 explains how to calculate this distance and how to determine the depths of the charges. To create a breach in the obstacle sufficiently wide to permit easy exit normally requires two charges, 5 feet apart.

d. Use of demolitions with standard breaching techniques can breach or weaken large dikes.

e. Applicable training literature adequately outlines detailed techniques of charge preparation, fusing, and firing of demolitions.

D–8. Brush Fill

This method is a field expedient in the truest sense. Brush fill relies entirely on vegetation, which is abundant throughout the country. It is an effective and simple means of crossing muddy bogs and canals (figs. D–19 and D–20).

Figure D–16. Using a timber, a vehicle pushes the mired vehicle.

Figure D–17. "Daisy chain" method of pushing.

D–9. Towing

Use of the towing technique is extensive during operations in inundated areas. In many instances, vehicles sink to a depth that makes attachment of the cable to the towing hook difficult. To overcome this difficulty, the unit may attach a 100-foot towing cable to the towing hook before the lead vehicle enters a canal or bog.

D–10. Block and Tackle (Waterborne)

a. The waterborne method of vehicle recovery is limited in application and is shown only for purposes of illustrating the ingenuity often required in negotiating inundated areas.

b. This method is unique in that the effort, in this instance, pulls the mired vehicle into the obstacle rather than out of it. Equipment required to use this technique is available through normal supply channels.

c. Figure D–21 shows vehicle 1 mired in mud on the bank of a canal and vehicles 2 through 9 waterborne on the canal. Canals may be from 9 to 12 meters wide. A block and tackle threaded with cable connects the left front lifting eye of vehicle 2 to the towing hook of vehicle 1. Vehicles 3 and 5 are dead men for vehicles 2 and 4 to keep them near the center of the waterway. All vehicles use towing cables to pull in the direction shown by arrows. An individual on vehicle 4 controls the operation, and all vehicles pull in unison at his command.

D–11. Block and Tackle (Landborne)

The block-and-tackle method is a substitute for the capstan-anchor method. With a suitable dead man on the far bank, the pulling vehicle does not have to be on the far bank (fig. D–22).

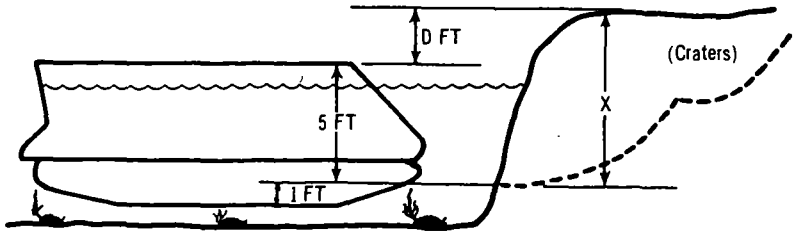
D–12. Log Bearings

a. In some instances, simultaneous lifting and pulling of vehicles are necessary. A simple way to provide this lift is to place logs or heavy timbers across the top of vehicle located at the edge of a canal. The tow cable passes over these logs or timbers.

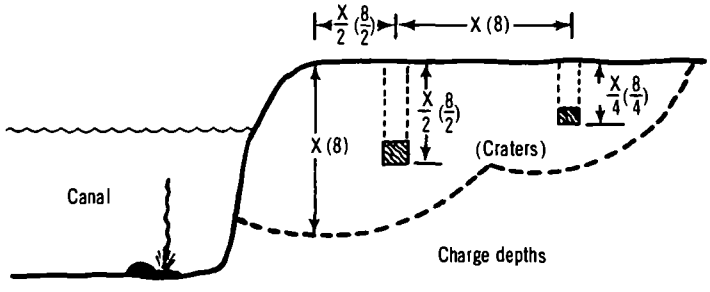
b. For this method of recovery, at least two vehicles are necessary on the recovery bank. One vehicle, with the logs, redirects the angle of pull so that the vehicle in the waterway is lifted as well as moved forward. As the vehicle in the waterway moves up and out, the vehicle with the logs gradually moves forward (fig. D–23).

D–13. S-Hook

a. The S-hook is a simple device, easily manufactured, that provides a means of attaching one end of a tow cable to a vehicle track.

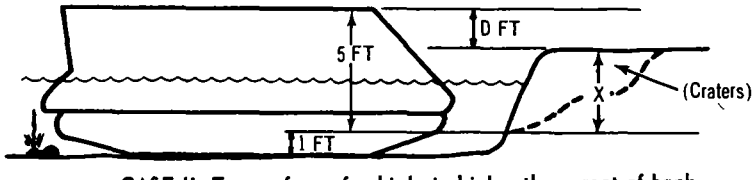


CASE I Top surface of vehicle is lower than crest of bank.
Distance x in feet = 5 + distance D in feet.

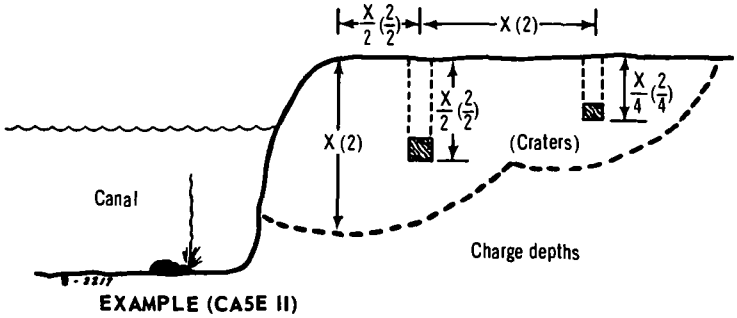


EXAMPLE (CASE I)

Distance x in feet = 5 + distance D in feet.
Assume D is 3 feet.
x = 5 + 3 = 8
x = 8



CASE II Top surface of vehicle is higher than crest of bank.
Distance x in feet = 5 − distance D in feet.



EXAMPLE (CASE II)

Distance x in feet = 5 − distance D in feet
Assume D is 3 feet
x = 5 − 3 = 2
x = 2

NOTE: The location of the crest of the river or canal bank is estimated and is the point from which measurements are made.

Figure D–18. Distance calculation for canal bank reduction.

Figure D–19. Brush fill is placed in the canal.

Figure D–20. Vehicle traverses canal without difficulty.

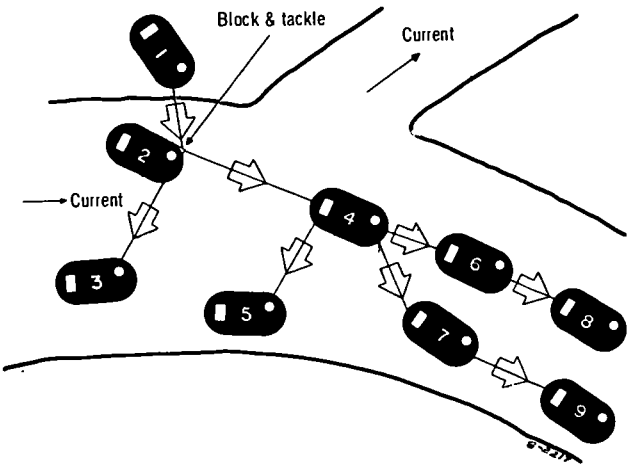


Figure D–21. Recovery technique using the block and tackle (waterborne).

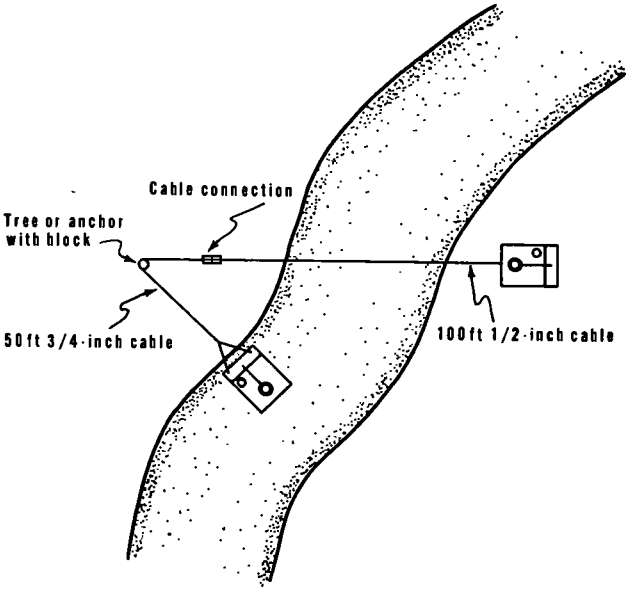


Figure D–22. Recovery technique using the block and tackle (landborne).

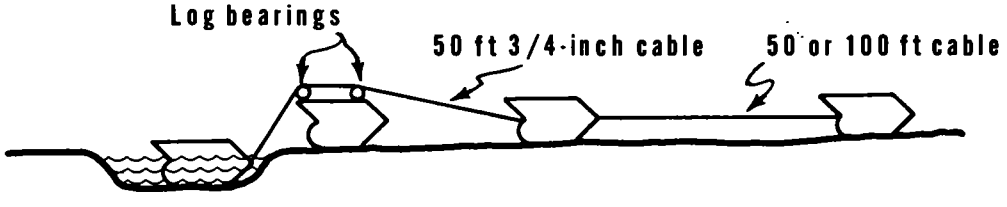


Figure D–23. Logs on top of an M113 provide lift.

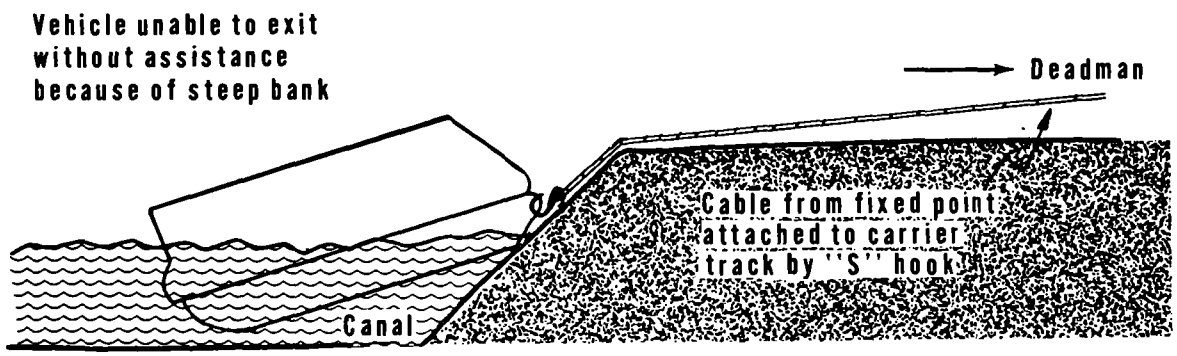
b. With one end of a two cable fastened to the track and the other end fastened to a dead man, a vehicle can pull itself from a canal (fig. D–24). The S-hook fastens to the eye of the tow cable and then hooks into an opening in the track.

c. If, in moving one track length, the vehicle is not free of the obstacle, a vehicle crewman adjusts the hook. With each readjustment, the cable is shortened to maintain tension between the "dead man" and the vehicle.

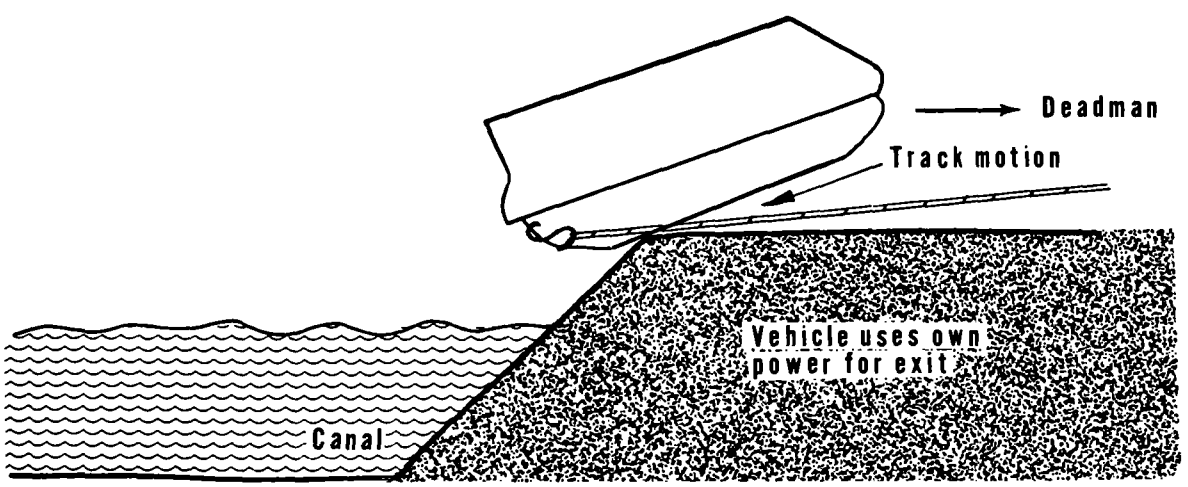
D–14. Swift-Current Crossings

a. Mechanized units often encounter difficulty crossing wide canals or rivers with swift currents.

b. On most streams in the Mekong Delta, exit sites require careful selection; and, in many cases, engineer preparation is necessary. Therefore, swimming vehicles must arrive at the designated exit point even though the current tends to sweep them downstream.


Vehicle unable to exit without assistance because of steep bank
Deadman
Cable from fixed point attached to carrier track by "S" hook
Canal

Step 1. Vehicle preparing to exit canal.



Step 2. Exit complete.

Figure D–24. Sketch of the S-hook method of self-recovery.

c. A very simple and effective method is available to prevent the vehicle from being swept downstream by the current: using a nylon rope tied to the upstream front lifting eye and dismounted troops on the far bank to pull the vehicle into the desired exit. A squad (or more) of men on the far bank position themselves upstream and, as the carrier enters the water and makes the crossing, keeping the rope taut. The swifter the current, the farther upstream the men need to be to exert sufficient lateral pull. If required, an additional rope, fastened to the rear lifting eye assists in maintaining proper direction of movement. Normally, one rope plus the propulsion of the vehicle is adequate (fig. D–25).

d. A nylon rope is strong, lightweight, and buoyant and does not become waterlogged through extensive use.

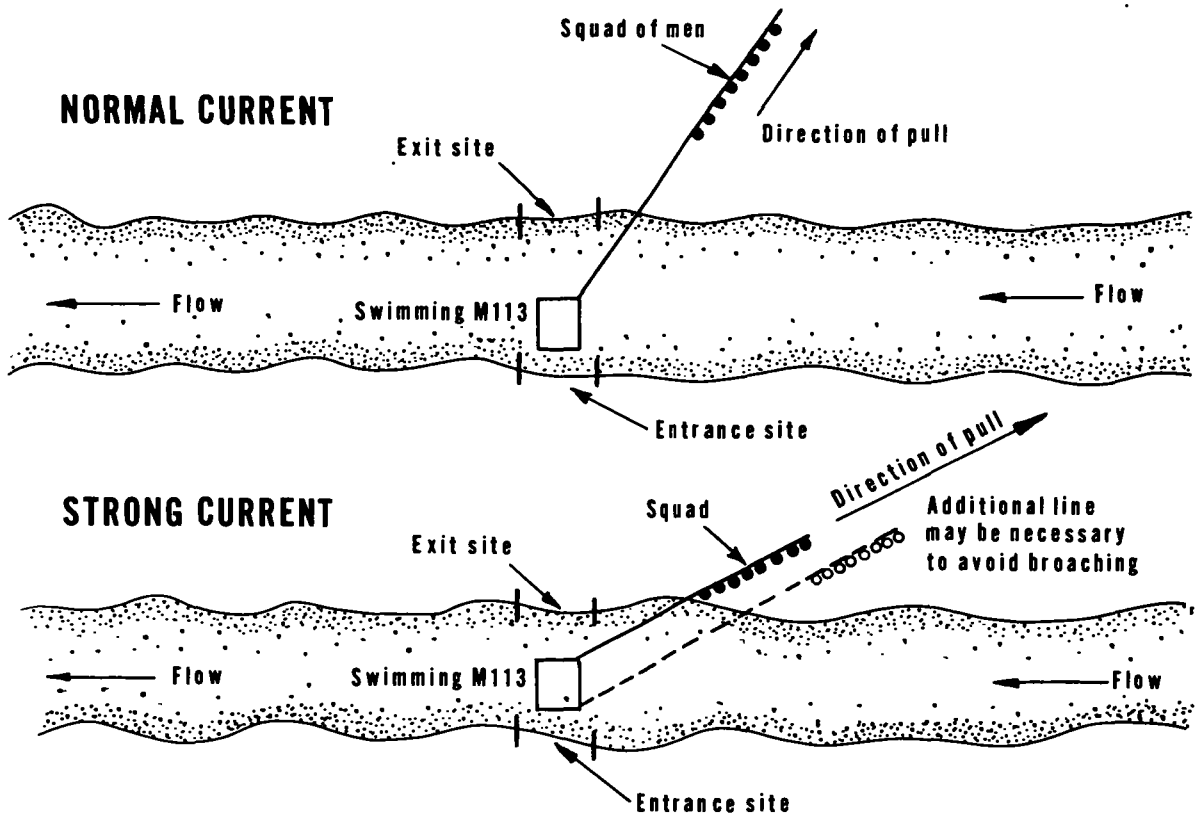


Figure D–25. Diagram of the swift-current crossing technique (schematic).

APPENDIX E
LOAD PLANS

E–1. General

In a riverine area, watercraft transport troops, supplies, and equipment to an area of operation (AO) and provide continuous support within the AO. The success of the ground tactical operation depends on planning, preparing, and executing water movements rapidly and efficiently.

E–2. Planning Considerations

When planning for waterborne movements, commanders and staff officers require familiarity with the type and the characteristics of available watercraft. Considerations in determining the number of watercraft required to support a mission follow:

a. Dimensions of the cargo compartment and the location and dimensions of the cargo door (or ramp).

b. Allowable cargo load (ACL) of the type of watercraft used for the operation. The Navy river assault squadron (RAS) commander provides this information.

c. Number of personnel, amount and configuration of equipment, and amount of supplies requiring transportation.

E–3. Determining Watercraft Requirements

After considering the foregoing factors and eliminating or replacing nontransportable items with transportable items, the planner uses the following methods to determine watercraft requirements:

a. Weight method.

b. Space method.

c. Type of load method.

E–4. Weight Method

The basis for this method is the consideration that total weight transported is the determining factor. The weight method provides a means to estimate watercraft requirements rapidly. It is not accurate enough for computation of watercraft requirements when the watercraft carry major items of equipment, supplies, and personnel in mixed loads.

Example: Weight to be transported.

Personnel (178x240 lb)	42,720
Cargo	33,000
Assault boats (16x356 lb)	5,696
Total weight	81,416

$$\frac{\text{Total weight}}{\text{ACL}} = \frac{81{,}416}{22{,}000} = \frac{\text{3.7 or 4 armored troop carriers (ATC) required}}{}$$

E–5. Space Method

a. The space method is a convenient method for computing watercraft requirements for battalion waterborne operations. The number of spaces required for personnel, weapons, ammunition, supplies, and vehicles normally does not change from one operation to the next, or with every change in allowable cargo load. The majority of computations remain constant; therefore, use of the space method decreases overall planning time.

b. A space is the weight of a combat-equipped soldier and his proportionate share of handcarried supplies and equipment—about 240 pounds.

c. In converting weight to spaces, the planner considers only whole or half spaces. He carries fractions to the next higher half or whole space. For example, 8.1 equals 8.5; 8.6 equals 9.0.

d. The planner converts major items of equipment (heavy weapons, vehicles, or assault boats) into spaces by dividing the weight of each item by 240. He converts additional supplies not carried by the individual soldier into

spaces by dividing their total weight by 240.

e. To determine the number of spaces a watercraft provides, the planner divides the ACL by 240. In converting ACL to spaces, he considers only whole spaces. He reduces fractions to the next lower whole space. For example, 22,000 ÷ 240 = 91.6 = 91 spaces.

f. The maximum spaces available for personnel normally do not exceed 60 percent of the total. For example, 60 percent of 91 spaces equals 54.6. Reducing this to the next lower whole number provides 54 spaces for personnel and 37 spaces for supplies and equipment.

E–6. Type of Load Method

a. The type of load method uses a prepared list of personnel, vehicles, equipment, and supplies for each particular type of watercraft. Planners develop sufficiently different loads to include all combinations of personnel, weapons, supplies, and equipment normally transported by watercraft. Preparation of different types of loads provides flexibility in planning waterborne operations.

b. Figures E–1 through E–9 depict typical types of loads. These figures show sample loads only and use the lightest weight equipment

1. Pers				11,040 lb
Rifle plat	44			
FO (81-mm mort)	1			
Medic	1			
	46 × 240 (lb) =		11,040 lb	
2. Sup				3,265 lb
Rations		46 (pers) × 2 (days) = 92 (rations)		
		92 + 4 = 23 (cases) × 25 (lb) =	575 lb	
Water		46 (pers) × 2 (gal per day) = 92 (gal)		
		× 2 (days) =		
		184 + 5 (gal can) = 37 (cans) × 50 (lb) =	1,850 lb	
MOGAS		100 (gal) + 5 (gal can) = 20 (cans)		
		× 42 (lb) =	840 lb	
3. Ammo				580 lb
Rifle 5.56-mm		3 (cases × 60 (lb) =	180 lb	
90-mm rcl rifle		2 × 10 (rd) × 10 (lb) =	200 lb	
Misc ammo			200 lb	
4. Assault boats		4 (each) × 356 lb =	1,424 lb	1,424 lb
		Subtotal	16,319 lb	
5. Available for other sup and equip				5,691 lb
		Total ACL		22,000 lb

Figure E–1. Example of type I load for ATC's.

1. Pers				12,480 lb
Rifle plat	44			
FO (81-mm mort)	1			
Medic	1			
81-mm mort sqd	6			
	52 × 240 lb =		12,480 lb	
2. Wpns				94 lb
1 81-mm mort			94 lb	
3. Sup				3,590 lb
Rations		52 (pers) × 2 (days) = 104 (rations)		
		104 + 4 = 26 (cases) × 25 lb =	650 lb	
Water		52 (pers) × 2 (gal per day) =		
		104 (gal) × 2 (days) =		
		208 (gal) + 5 (gal) = 42 (cans) × 50 (lb) =	2,100 lb	
MOGAS		100 (gal) + 5 (gal can) =		
		20 (cans) × 42 (lb) =	840 lb	
4. Ammo				1,640 lb
Rifle 5.56-mm		3 (cases) × 60 (lb) =	180 lb	
90-mm rcl rifle		2 × 10 (rd) × 10 (lb) =	200 lb	
81-mm mort		1 × 80 (rd) = 80 rd		
		80 + 4 = 20 (cases) × 53 (lb) =	1,060 lb	
Misc ammo			200 lb	
5. Assault boats		4 (each) × 356 (lb) =	1,424 lb	1,424 lb
		Subtotal	19,228 lb	
6. Available for other sup and equip				2,772 lb
		Total ACL		22,000 lb

Figure E–2. Example of type II load for ATC's.

available. (Example: M3 baseplate is used instead of the heavier, more common M23A1 for the 81-mm mortar; and the new lightweight inner ring is used for the 4.2-inch mortar.) Many other combinations can be chosen. The weight shown as "available for other supplies and equipment" provides space for additional supplies and equipment that subordinate commanders designate.

c. The length of some waterborne operations requires the serving of hot meals in the AO. ATC transport mess teams, equipment, and rations to the AO. Mess teams may prepare meals en route or after the troops debark.

d. The height of the armor protection on ATC's limits cargo heights to that of the armor. However, when the cargo does not require armor protection, removal of the canopy permits equipment or supplies to extend higher than the height of the armor plate. The load is within the weight limitations in either case. Figure E–10 shows loading data and a diagram of an ATC.

E–7. Water Movement Forms

The planner uses the following water movement forms in planning, preparing, and conducting waterborne operations to insure timely and coordinated effort by all forces involved.

a. Water Movement Table. The Army battalion commander and the Navy RAS commander jointly prepare this table. Based on the landing plan, this table provides movement

1.	Pers			12,960 lb
	Rifle plat	42		
	FO (81-mm mort)	1		
	Medic	1		
	Engr	10		
		54 × 240 =	12,960 lb	
2.	Sup			3,715 lb
	Rations	54 (pers) × 2 (days) = 108 rations		
		108 ÷ 4 = 27 (cases) × 25 (lb) =	675 lb	
	Water	54 (pers) × 2 (gal per day) =		
		108 (gal) × 2 (days) =		
		216 ÷ 5 (gal can) = 44 (cans) × 50 (lb) =	2,200 lb	
	MOGAS	100 (gal) ÷ 5 (gal can) =		
		20 (cans) × 42 (lb) =	840 lb	
3.	Ammo			680 lb
	Rifle 5.56-mm	3 (cases) × 60 (lb) =	180 lb	
	90-mm rcl rifle	2 × 10 (rd) × 10 (lb) =	200 lb	
	Misc ammo		300 lb	
4.	Assault boats	4 (each) × 356 (lb) =	1,424 lb	1,424 lb
		Subtotal	18,779 lb	
5.	Available for other sup and equip			3,766 lb
		Total ACL		22,000 lb

Figure E–3. Example of type III load for ATC's.

1.	Pers			2,880 lb
	Rifle co HQ	6		
	FO team (4.2-in mort)	2		
	FO team (105-mm how)	3		
	Medic	1		
		12 × 240 =	2,880 lb	
2.	Sup			1,490 lb
	Rations	12 (pers) × 2 (days) = 24 rations		
		24 ÷ 4 = 6 (cases) × 25 (lb) =	150 lb	
	Water	12 (pers) × 2 (gal per day) =		
		24 (gal) × 2 (days) =		
		48 (gal) ÷ 5 (gal can) = 10 (cans) × 50 (lb) =	500 lb	
	MOGAS	100 (gal) ÷ 5 (gal can) =		
		20 (cans) × 42 (lb) =	840 lb	
3.	Assault boats	3 (each) × 356 (lb) =	1,068 lb	1,068 lb
		Subtotal	5,438 lb	
4.	Available for other sup and equip			16,562 lb
		Total ACL		22,000 lb

Figure E–4. Example of type IV load for ATC's.

1.	Pers			6,720 lb
	Rifle co HQ	6		
	FO team (4.2-in mort)	2		
	FO team (105-mm how)	3		
	Medic	1		
	2 sqd 81-mm mort	12		
	81-mm mort FDC	4		
		28 × 240 lb =	6,720 lb	
2.	Wpns			188 lb
	2 81-mm mort		188 lb	
3.	Sup			2,340 lb
	Rations	28 (pers) × 2 (days) = 56 rations		
		56 ÷ 4 = 14 (cases) × 25 (lb) =	350 lb	
	Water	28 (pers) × 2 (gal per day) =		
		56 (gal) × 2 (days) =		
		112 (gal) ÷ 5 (gal can) = 23 (cans) × 50 (lb) =	1,150 lb	
	MOGAS	100 (gal) ÷ 5 (gal can) = 20 (cans) × 42 (lb) =	840 lb	
4.	Ammo			
	81-mm mort	2 (mort) × 80 (rd) = 160 rd		
		160 ÷ 4 = 40 (case) × 53 (lb) =	2,120 lb	
	Misc ammo		200 lb	
5.	Assault boats	5 (each) × 356 lb =	1,780 lb	1,780 lb
		Subtotal	13,340 lb	
6.	Available for other sup and equip			8,660 lb
		Total ACL		22,000 lb

Figure E–5. Example of type V load for ATC's.

1.	Pers			5,040 lb
	4.2-in mort plat	21 × 240 lb =	5,040 lb	
2.	Wpns			1,280 lb
	2 4.2-in mort		1,280 lb	
3.	Sup			1,965 lb
	Rations	21 (pers) × 2 (days) = 42 rations		
		42 ÷ 4 = 11 (cases) × 25 (lb) =	275 lb	
	Water	21 (pers) × 2 (gal per day) =		
		42 (gal) × 2 (days) =		
		84 (gal) ÷ 5 (gal cans) =		
		17 (cans) × 50 (lb) =	850 lb	
	MOGAS	100 (gal) ÷ (gal can) =		
		20 (cans) × 42 (lb) =	840 lb	
4.	Ammo			4,320 lb
	4.2-in mort	100 (rd) ÷ 2 = 50 (cases) × 82 (lb) =		
		4 (each) × 356 (lb) =	4,100 lb	
	Misc ammo		420 lb	
5.	Assault boats		1,424 lb	1,424 lb
		Subtotal	14,029 lb	
6.	Available for other sup and equip			7,971 lb
		Total ACL		22,000 lb

Figure E–6. Example of type VI load for ATC's.

data for the operation. It is usually an appendix to the water movement plan annex. Figure E–11 illustrates a partly completed water movement table.

b. Watercraft Loading Table. Army commanders prepare this table to specify the personnel, equipment, and vehicles loaded on each watercraft. The watercraft loading table need list only the type of load number and weight. When ATC transport cargo and personnel in addition to types of loads, the cargo and equipment are listed by item and weight. The watercraft loading table is usually an appendix to the water movement plan annex. The Navy commander normally receives a copy for information. Figure E–12 illustrates a sample table.

1. Pers			2,400 lb
4.2-in mort plat	10 × 240 lb =	2,400 lb	
2. Wpns			640 lb
1 4.2-in mort		640 lb	
3. Sup			1,116 lb
Rations	10 (pers) × 2 (days) = 20 rations		
	20 ÷ 4 = 5 (cases) × 25 (lb) =	125 lb	
Water	10 (pers) × 2 (gal per day) =		
	20 (gal) × 2 (days) =		
	40 ÷ 5 (gal can) = 8 (cans) × 50 (lb) =	200 lb	
MOGAS	100 (gal) ÷ 5 (gal can) =		
	20 (cans) × 42 (lb) =	840 lb	
4. Ammo			11,162 lb
4.2-in mort	250 (rd) ÷ 2 = 125 cases		
	125 × 82 (lb) =	10,250 lb	
Misc ammo		200 lb	
5. Assault boats	2 (each) × 356 (lb) =	712 lb	
	Subtotal	15,318 lb	
6. Available for other sup and equip			6,682 lb
	Total ACL		22,000 lb

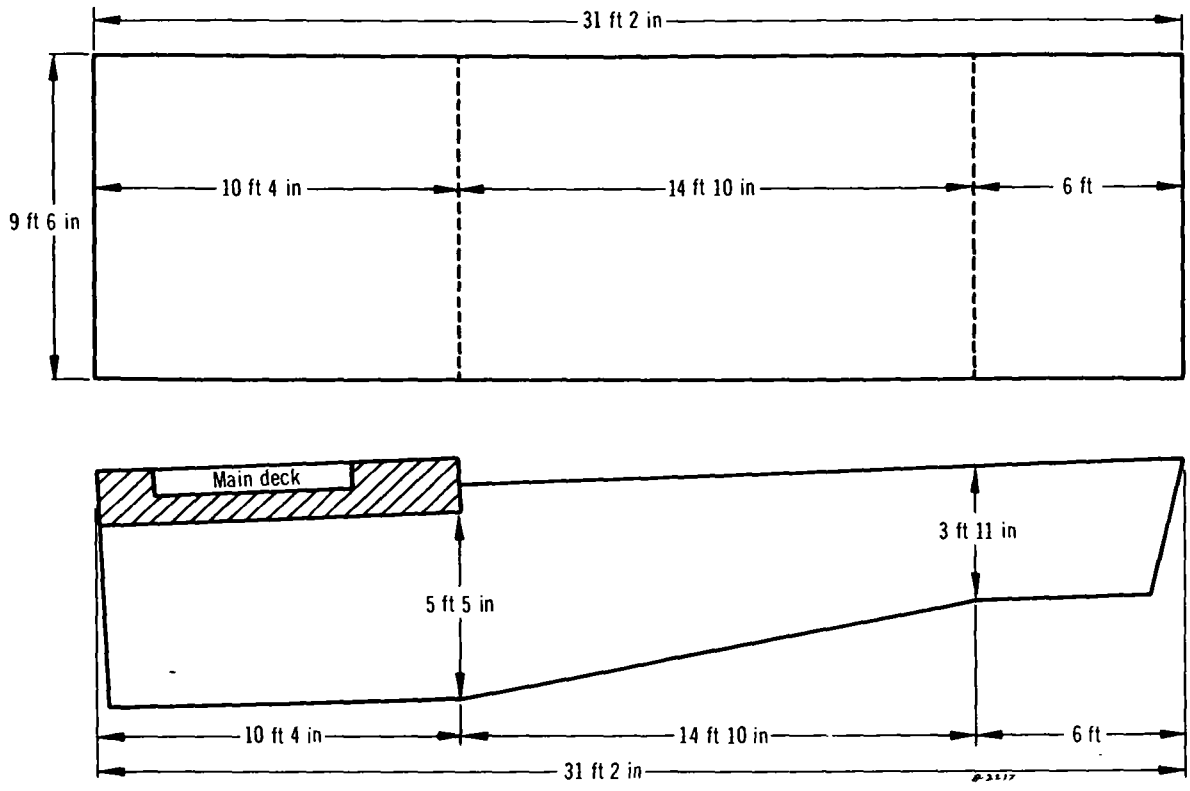
Figure E–7. Example of type VII load for ATC's.

1. Pers			960 lb
Bn S4 and spt plat	4 × 240	960 lb	
2. Sup			20,950 lb
C1 I		5,000 lb	
C1 II, IV, VI, VII, VIII, IX, and X		1,000 lb	
C1 III		250 lb	
C1 V		14,700 lb	
	Subtotal	21,910 lb	
Available for other sup and equip			80 lb
	Total ACL		22,000 lb

Figure E–8. Example of type VIII load for ATC's.

1. Pers			2,160 lb
105-mm how sec	9 × 240 =		
2. Wpns			5,236 lb
1 105-mm how (towed)			
3. Ammo			1,020 lb
105-mm how	20 (rd) × 51 lb		
4. Veh			13,580 lb
1 2½-ton trk WWN			
	Total		21,996 lb
	Total ACL		22,000 lb

Figure E–9. Example of type IX load for ATC's.



LOADING DATA

Length of cargo compartment	–31 ft 2 in	Width of cargo entrance	– 9 ft 6 in
Width of cargo compartment	– 9 ft 6 in	Height of cargo entrance with canopy	– 5 ft 9 in
Height of cargo compartment with canopy	– 5 ft 9 in to 7 ft 10 in	Allowable cargo load	– 22,000 lb
Height of armor protection	– 3 ft 11 in to 5 ft 5 in		

Figure E–10. Loading data for ATC (schematic).

Serial or movement unit	Army unit	Naval unit	Number/type watercraft	Chalk number	Loading area/station or site	Loading time	Departure time	Rendezvous area	Start point time	Release point time	Landing area/aite	Landing time	Initial objective	Remarks
1	Co A	RAS–7	4/ATC	1–4	A/2, 4, 6, 8	0440	0450	Z	0500	0850	B/1, 2, 3, 4	0900	WHITE	
	2 sqd hv mort plat		1/ATC	5	C/3						A/3		-	Firing pos vic LS-3
	1 S4 cbt tns ATC		1/ATC	6	D/1	0410					-	-	-	Remain afloat
	(CPT Smith)	(LTJG Brown)												
2	Co B	RAS–7	4/ATC	7–10	A/1, 3, 5, 7	0440	0455	X	0505	0855	A/1, 2, 3, 4	0900	RED	
	2 sqd hv mort plat		1/ATC	11	C/4						A/3			Firing pos vic LS-3

Figure E–11. Example of water movement table (partly completed).

Appendix _____ Headquarters _____

To _____ Date _____

Serial or movement unit	Naval unit	Watercraft		Ground unit	Watercraft loaded with	Loading area/site and time	Remarks
		Chalk number	Hull number				

Figure E–12. Typical watercraft loading table format.

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	d(3)(*e*),	25
	4–13*c*(6)(*c*),	31
	5–3*f*,	57
	5–16	60
Air defense artillery	6–6*e*(3)	73
Air reconnaissance	4–14*b*(6)(*b*)	44
Airboats	4–6*c*(1)(*g*)	24
	5–3*f*	57
Airborne forces	4–1*e*	20
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